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## Exhibit C

Johnson Vineyard ECP  
Hydrology Study R1  
01/09/20

### Johnson Vineyard

### 3363 Hwy 128 - Hydrology Study

Prepared by Napa Valley Vineyard Engineering, Inc

March 27 2019, January 9, 2020

Revision 1

## INTRODUCTION

Johnson Vineyard seek approval of approximately 7.09 net acres of new vineyard. The project lies within APN 017-160-038, a 40.0 acre parcel located at 3363 Hwy 128, Calistoga.

This hydrology study is to determine the anticipated affect the proposed vineyard development project will have on local hydrology and runoff patterns in areas A thru D. Hydrologic modeling of existing and proposed conditions was performed using HydroCad, Urban Hydrology for Small Watersheds with the CA-1 rainfall distribution curve. Following is a summary of the data used to complete the hydrologic analysis and the results of this analysis.

## RAINFALL DATA

Rainfall depths for the project site were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data for California, which uses the latitude and longitude of the Johnson Vineyard project are estimated to be 38.5891 N, -122.6255 W, based on information obtained from (NOAA) Atlas 14 site.

The following rainfall data from the NOAA website was used in the analysis:

2 year, 24 hour	5.09 inches
100 year, 24 hour	11.9 inches

Rainfall data for the interim storm events were interpolated as:

5 year, 24 hour	6.58 inches
10 year, 24 hour	7.75 inches
25 year, 24 hour	9.43 inches
50 year, 24 hour	10.7 inches

## WATERSHED AREAS

The four project sites drain towards unnamed streams thence lies in Blossom Creek Subwatershed. The points of interest for this analysis are points along the streams. The watershed for Area A is approximately 28.40 acres, Area B 2.45 acres, Area C 24.90 acres and Area D 15.05 and was delineated based on topographic data from the Napa County GIS Data Base website. The maps included in Appendix A, depict the watershed, the existing land uses, and the proposed vineyard project.

## **PRE-PROJECT WATERSHED CONDITIONS**

### **Soil Types**

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County, August 1978, maps the following soil types within the watershed:

SCS #101, Aiken loam 2 to 15% slopes  
(Hydrologic Soil Group (HSG) C)

SCS #103, Bale loam 0 to 2% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #105, Bale clay loam 2 to 5% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #139, Forward gravelly loam 9 to 30% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #140, Forward gravelly loam 30 to 75% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #141, Forward kidd complex 50 to 75% slopes  
(Hydrologic Soil Group (HSG) C)

### **Land Use**

Land use within the subject watersheds was analyzed based on the 2017 Google aerial photograph obtained from the Google GIS website. Area A consists of 2.61 acres of grasslands with scattered brush, 20.71 acres of tree canopy, 4.83 acres of existing vineyard and 0.24 acres of existing developed areas. Area B consists of 0.08 acres of grasslands with scattered brush, 1.44 acres of tree canopy and 0.94 acres of existing vineyard. Area C consists of 2.55 acres of grasslands with scattered brush, 18.05 acres of tree canopy, 2.34 acres of existing vineyard, 1.57 acres of water surface and 0.39 acres of existing developed areas. Area D consists of 1.42 acres of grasslands with scattered brush, 12.92 acres of tree canopy, and 0.71 acres of existing vineyard areas. The grasslands and scatter brush areas are considered to be in a “good” to “fair” condition, and the tree areas are considered to be in a “fair” condition. A detailed breakdown of land use by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

## **Time of Concentration**

The time of concentration represents the time it takes for rainfall in the most hydraulically remote portion of the watershed to reach the point of interest. The time of concentration was estimated assuming sheet flow for 100 feet in the uppermost reaches of the watershed. A shallow concentrated flow regime was used to model the runoff down to the point of interest. Mannings coefficients were selected to represent the respective surface conditions. A detailed breakdown of the time of concentration parameters is included in the HydroCad Reports, Appendix A and are shown on the Drainage Area Map.

## **POST PROJECT WATERSHED CONDITIONS**

### **Soil Types**

The proposed vineyard development occurs within the areas mapped as

SCS #101, Aiken loam 2 to 15% slopes  
(Hydrologic Soil Group (HSG) C)

SCS #103, Bale loam 0 to 2% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #105, Bale clay loam 2 to 5% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #139, Forward gravelly loam 9 to 30% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #140, Forward gravelly loam 30 to 75% slopes  
(Hydrologic Soil Group (HSG) B)

SCS #141, Forward kidd complex 50 to 75% slopes  
(Hydrologic Soil Group (HSG) C)

### **Land Use**

The proposed project will convert 7.93 acres of trees, 1.44 acres of brush and pasture grasses. Some development areas with-in the proposed vineyard areas will be relocated by avenues around the vineyard areas. The project proposes a no-till cover crop with spot spray only, which is considered a "good" hydrologic condition. Vineyard avenues/turnspaces will be maintained in a no-till cover and are modeled as part of the vineyard. All other areas within the watershed are assumed to remain unchanged including the all weather access road to the house in the project area. A detailed breakdown of land uses by area and hydrologic soil group is included in the HydroCad Reports, Appendix A.

## Time of Concentration

Time of concentration under post-project conditions will not increase in the watersheds. The erosion control measures provided within the project area include. The time of concentration is estimated assuming sheet flow for 100 feet in the uppermost reaches of each watershed area, and shallow concentrated flow over the hillside to the POI. A detailed breakdown of the time of concentration parameters is included in the HydroCad Report.

## CALCULATED RUNOFF RATE

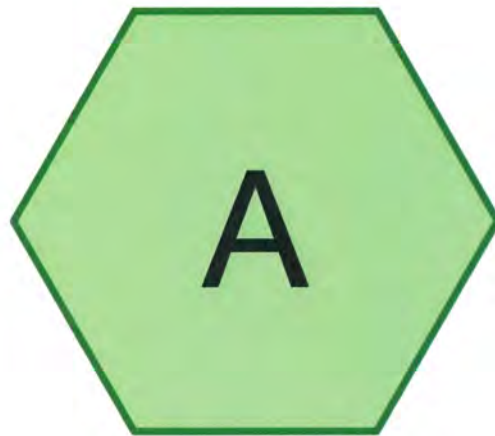
Using the rainfall data, watershed area, land use and time of concentration parameters described above and included in Appendix A, the following runoff rates were calculated:

### HydroCad Calculated Peak Runoff Rate (cfs)

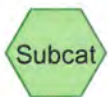
24 hr. storm event	2 yr.		5 yr.		10 yr.		25 yr.		50 yr.		100 yr.	
Project Condition	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
Watershed A	3.62	3.62	6.93	6.93	9.85	9.85	14.35	14.35	17.93	17.93	21.40	21.40
Watershed B	0.33	0.33	0.66	0.66	0.94	0.94	1.39	1.39	1.74	1.74	2.08	2.08
Watershed C	7.28	7.28	11.51	11.51	14.99	14.99	20.12	20.12	24.05	24.05	27.79	27.79
Watershed D	2.55	2.55	4.66	4.66	6.50	6.50	9.31	9.31	11.52	11.52	13.67	13.67

## CONCLUSION

The hydrologic analysis presented above and supporting information in the Appendix, demonstrate that the proposed vineyard development with appropriate mitigation measures will not increase the peak runoff rate in the affected watersheds.



# PRE WS A



## Routing Diagram for PRE WS A R1

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**PRE WS A R1**

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CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 3.62 cfs @ 12.79 hrs, Volume= 2.727 af, Depth> 1.15"

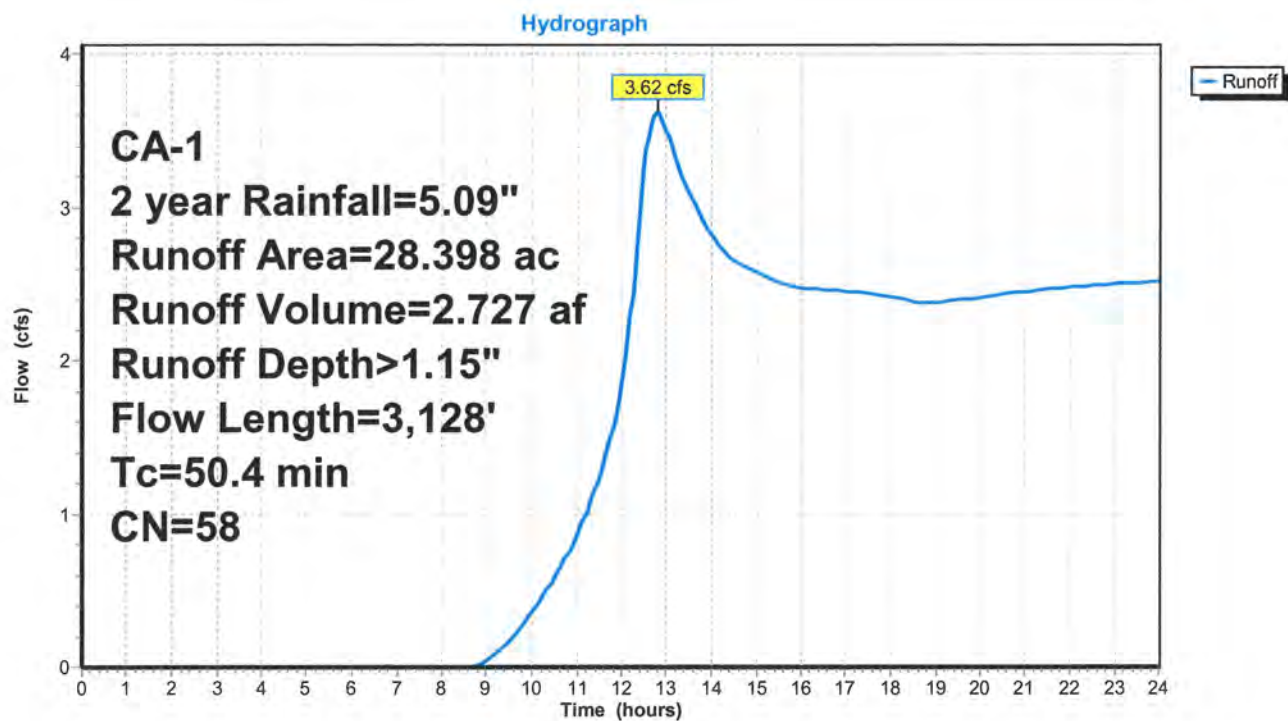
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## Subcatchment A: PRE WS A



**PRE WS A R1**

CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 6.93 cfs @ 12.74 hrs, Volume= 4.797 af, Depth&gt; 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

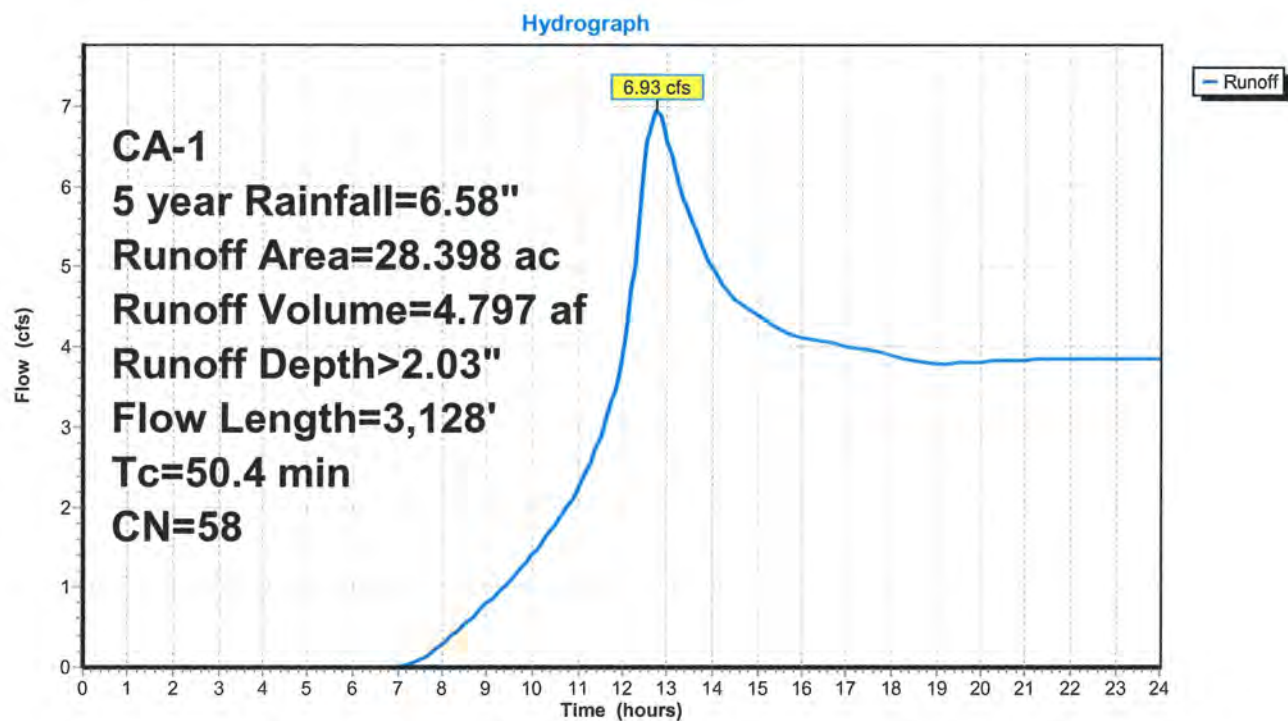
Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			



## Subcatchment A: PRE WS A



**PRE WS A R1**

CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 9.85 cfs @ 12.72 hrs, Volume= 6.632 af, Depth&gt; 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

# PRE WS A R1

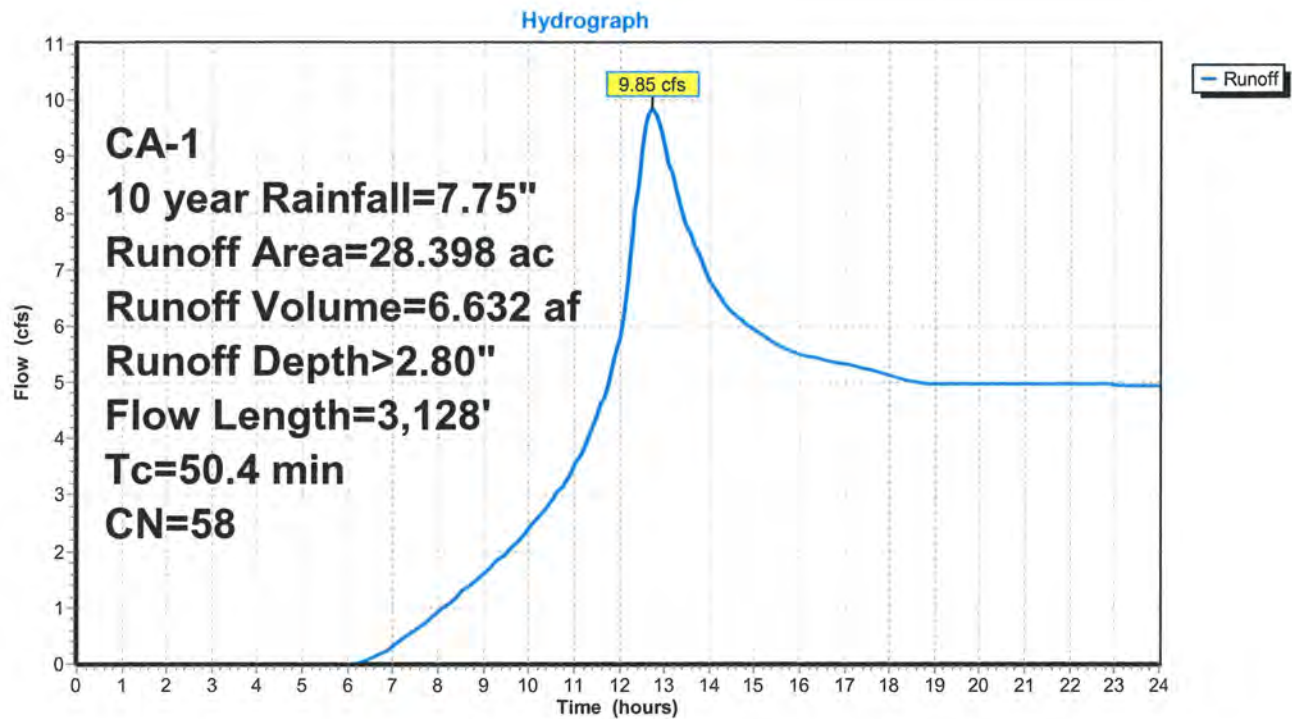
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CA-1 10 year Rainfall=7.75"

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## Subcatchment A: PRE WS A



**PRE WS A R1**

CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 14.35 cfs @ 12.71 hrs, Volume= 9.498 af, Depth&gt; 4.01"

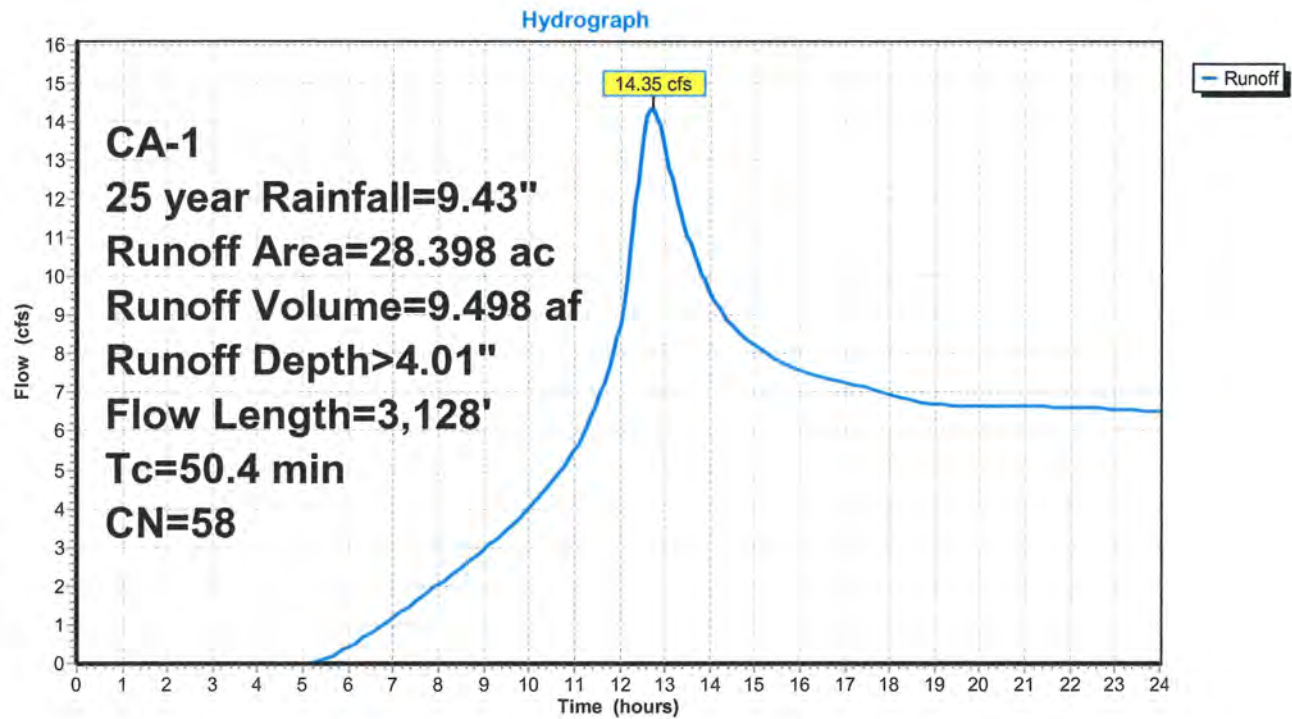
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## Subcatchment A: PRE WS A



**PRE WS A R1**

CA-1 50 year Rainfall=10.70"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 17.93 cfs @ 12.71 hrs, Volume= 11.801 af, Depth&gt; 4.99"

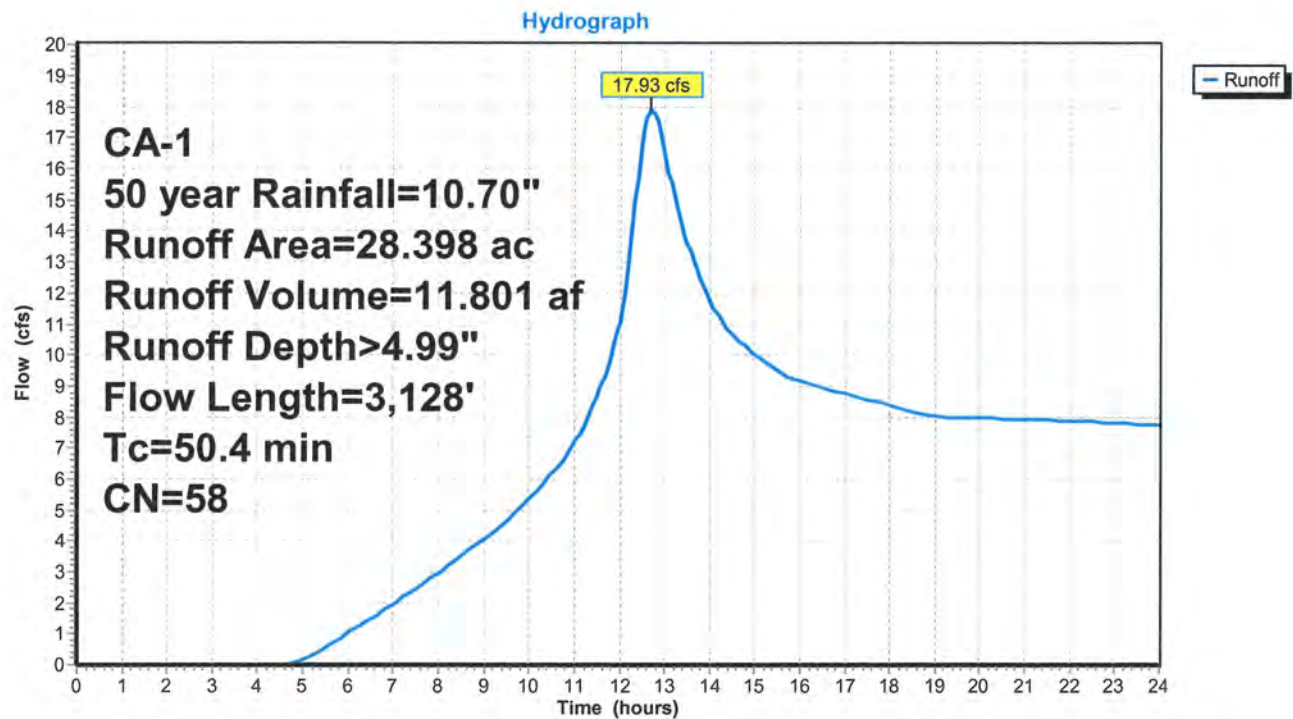
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## Subcatchment A: PRE WS A



**PRE WS A R1**

CA-1 100 year Rainfall=11.90"

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**Summary for Subcatchment A: PRE WS A**

Runoff = 21.40 cfs @ 12.70 hrs, Volume= 14.059 af, Depth&gt; 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

CA-1 100 year Rainfall=11.90"

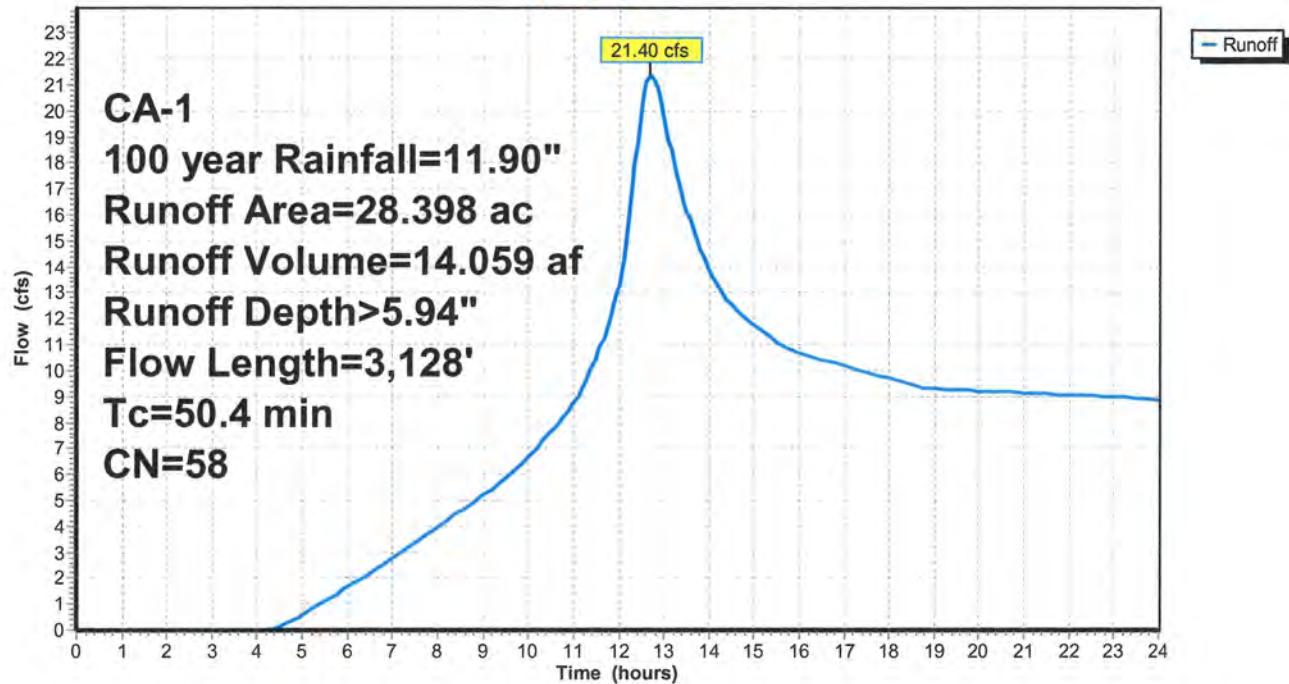
Area (ac)	CN	Description
19.508	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.162	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 4.141	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

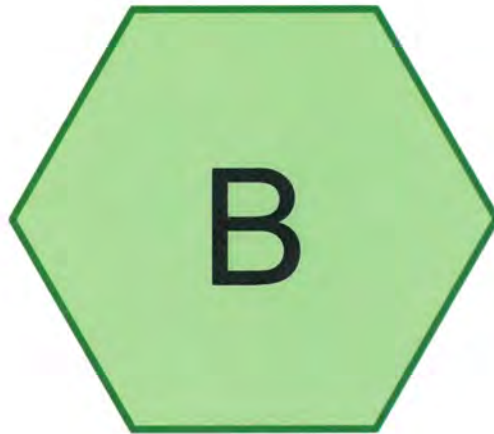
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Pre WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Pre WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			



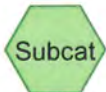
## Subcatchment A: PRE WS A

Hydrograph





PRE WS B



**Routing Diagram for PRE WS B R1**

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**PRE WS B R1**

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CA-1 2 years Rainfall=5.09"

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**Summary for Subcatchment B: PRE WS B**

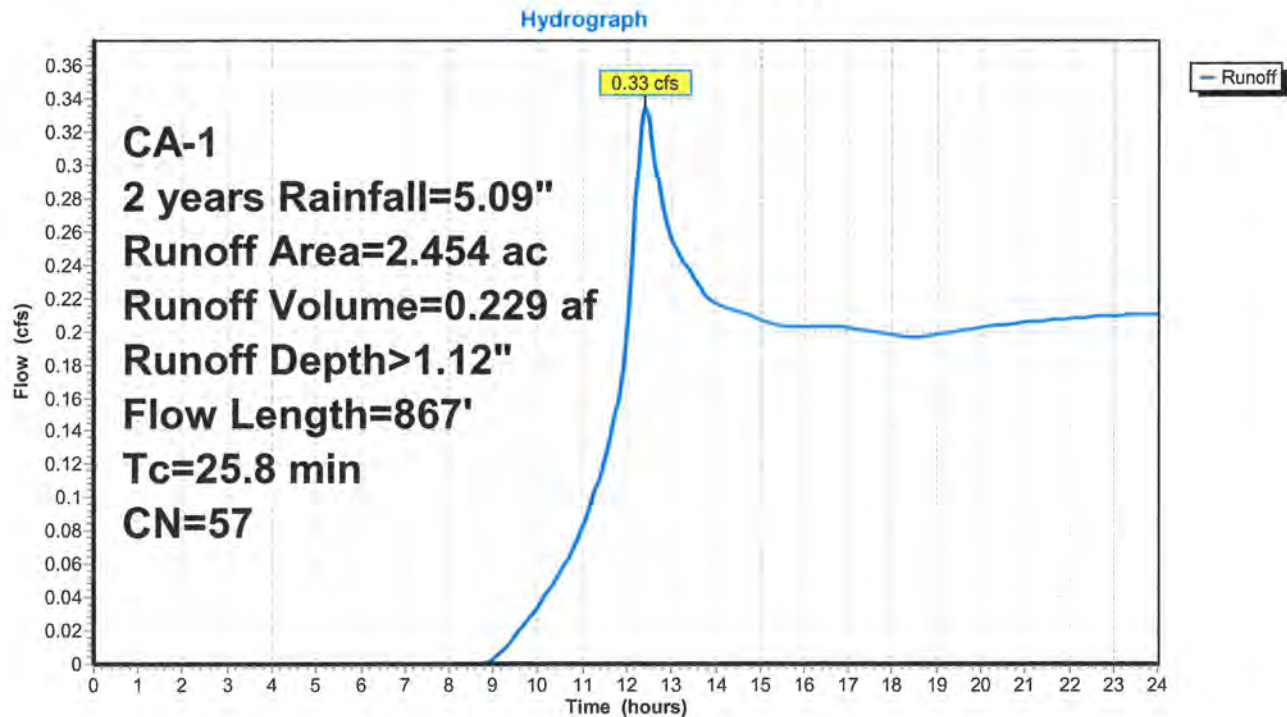
Runoff = 0.33 cfs @ 12.40 hrs, Volume= 0.229 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 years Rainfall=5.09"

Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b> Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b> Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b> Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**

**PRE WS B R1**

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CA-1 5 years Rainfall=6.58"

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**Summary for Subcatchment B: PRE WS B**

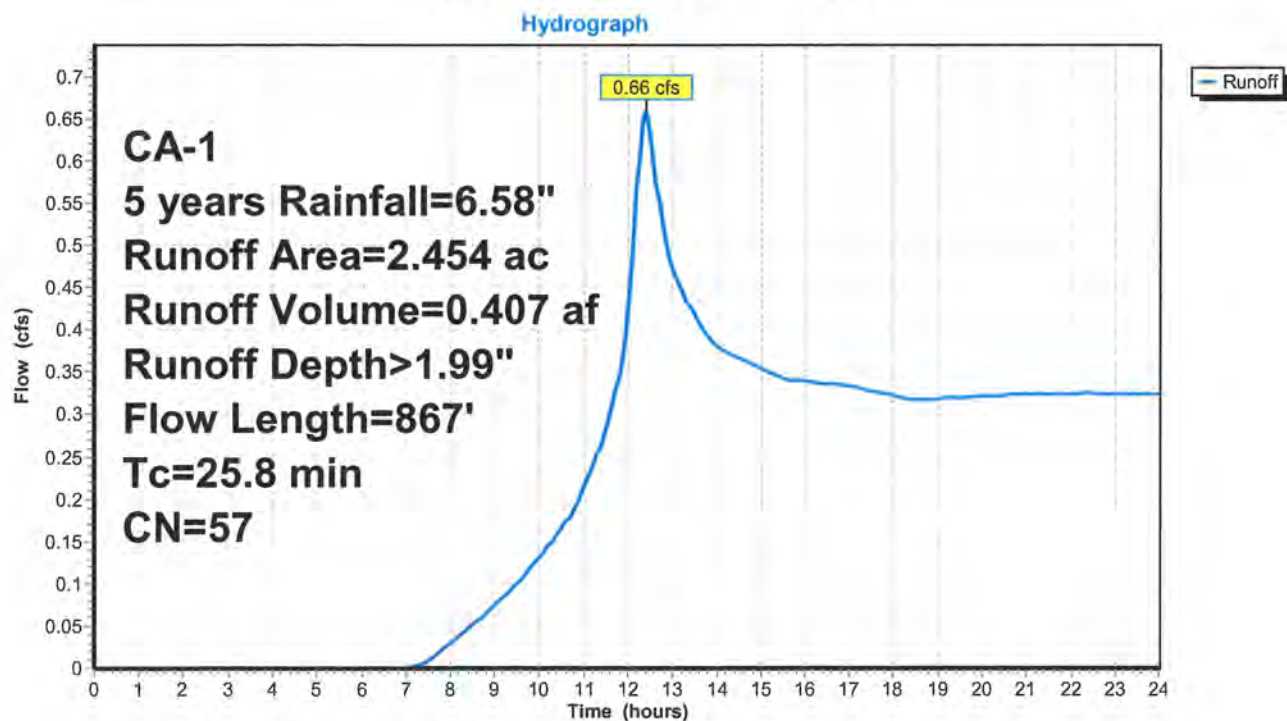
Runoff = 0.66 cfs @ 12.39 hrs, Volume= 0.407 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 years Rainfall=6.58"

Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**



**PRE WS B R1**

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CA-1 10 years Rainfall=7.75"

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**Summary for Subcatchment B: PRE WS B**

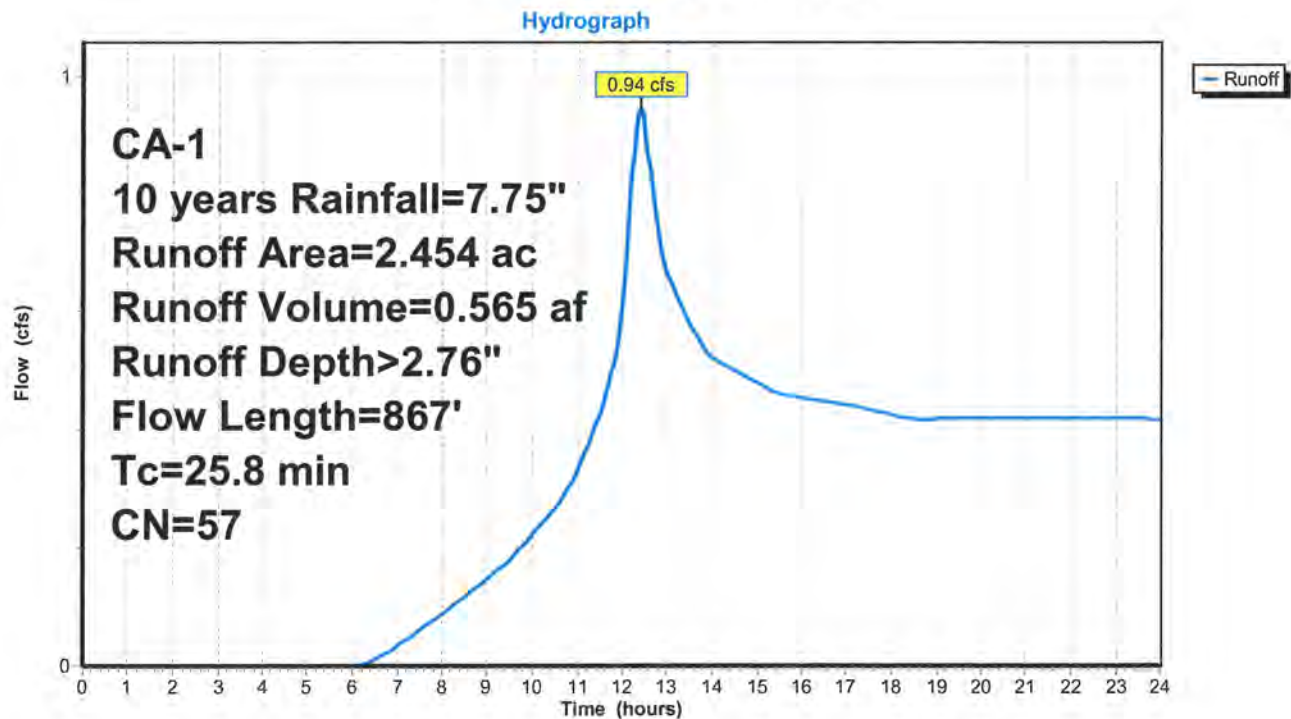
Runoff = 0.94 cfs @ 12.38 hrs, Volume= 0.565 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 years Rainfall=7.75"

Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b> Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b> Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b> Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**

**PRE WS B R1**

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CA-1 25 years Rainfall=9.43"

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**Summary for Subcatchment B: PRE WS B**

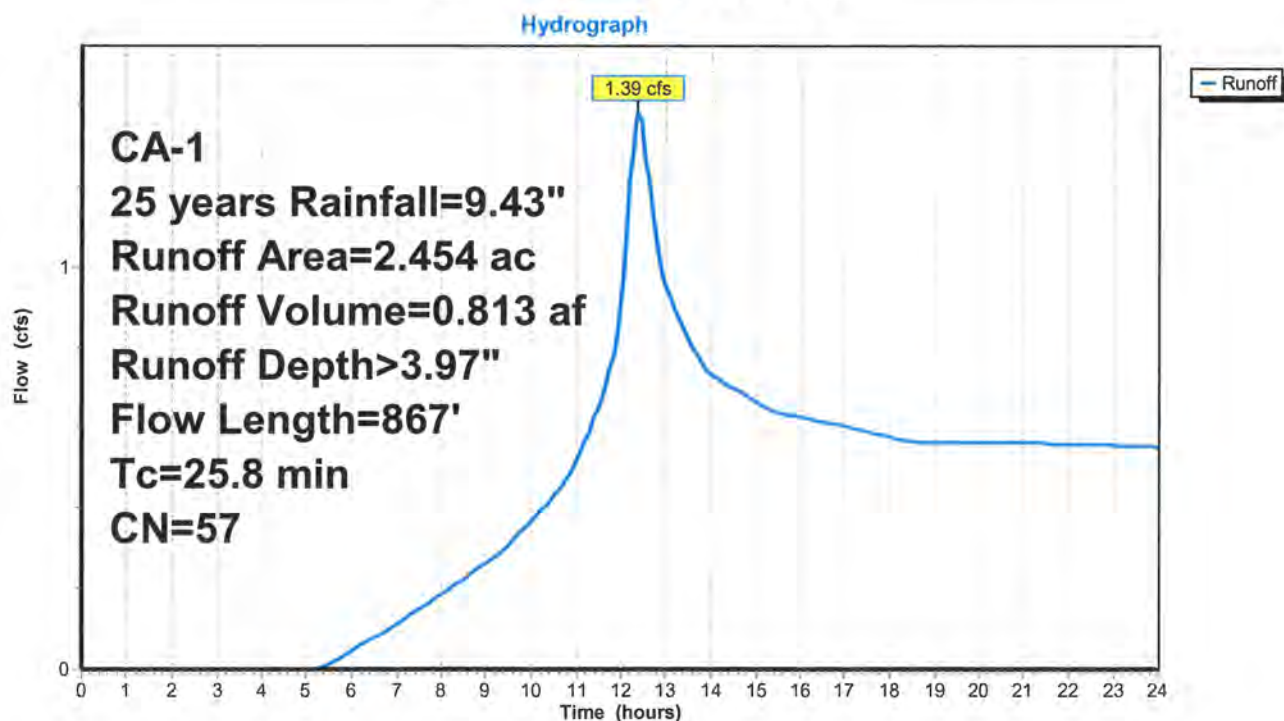
Runoff = 1.39 cfs @ 12.37 hrs, Volume= 0.813 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 years Rainfall=9.43"

Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**

**PRE WS B R1**

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CA-1 50 years Rainfall=10.70"

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**Summary for Subcatchment B: PRE WS B**

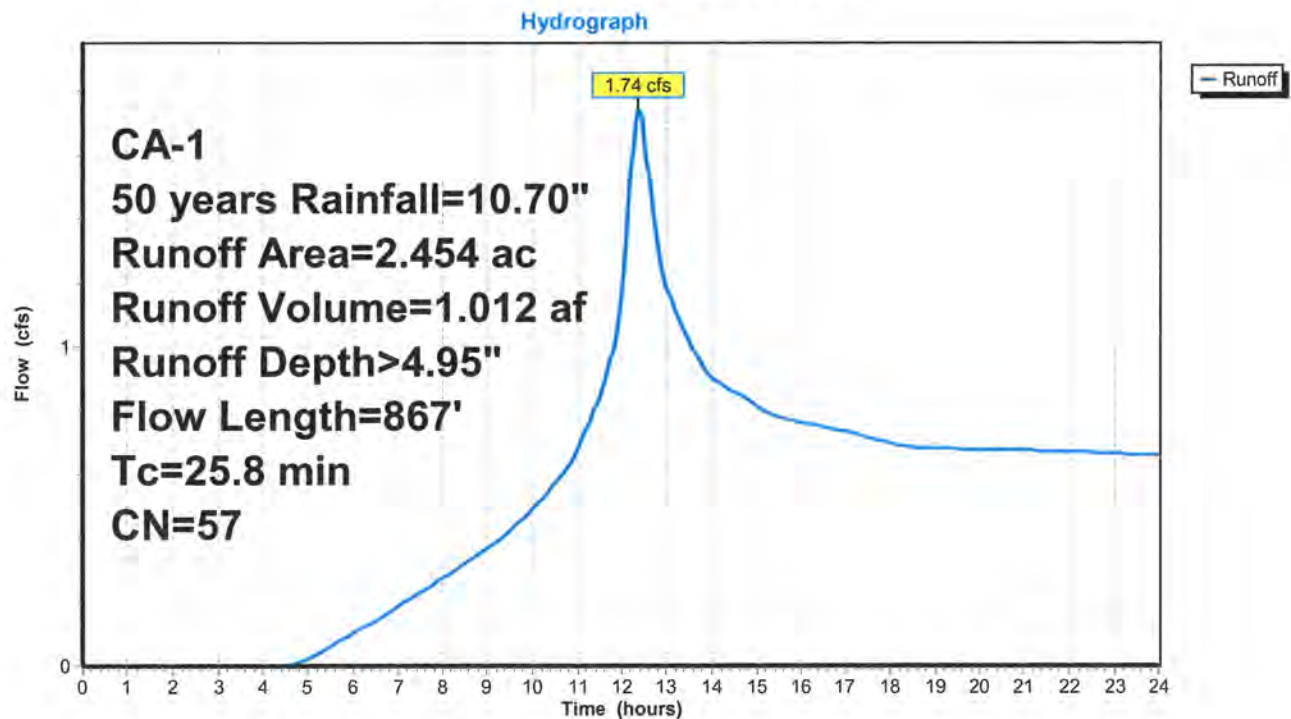
Runoff = 1.74 cfs @ 12.37 hrs, Volume= 1.012 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 years Rainfall=10.70"

Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b> Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b> Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b> Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**



**PRE WS B R1**

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CA-1 100 years Rainfall=11.90"

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**Summary for Subcatchment B: PRE WS B**

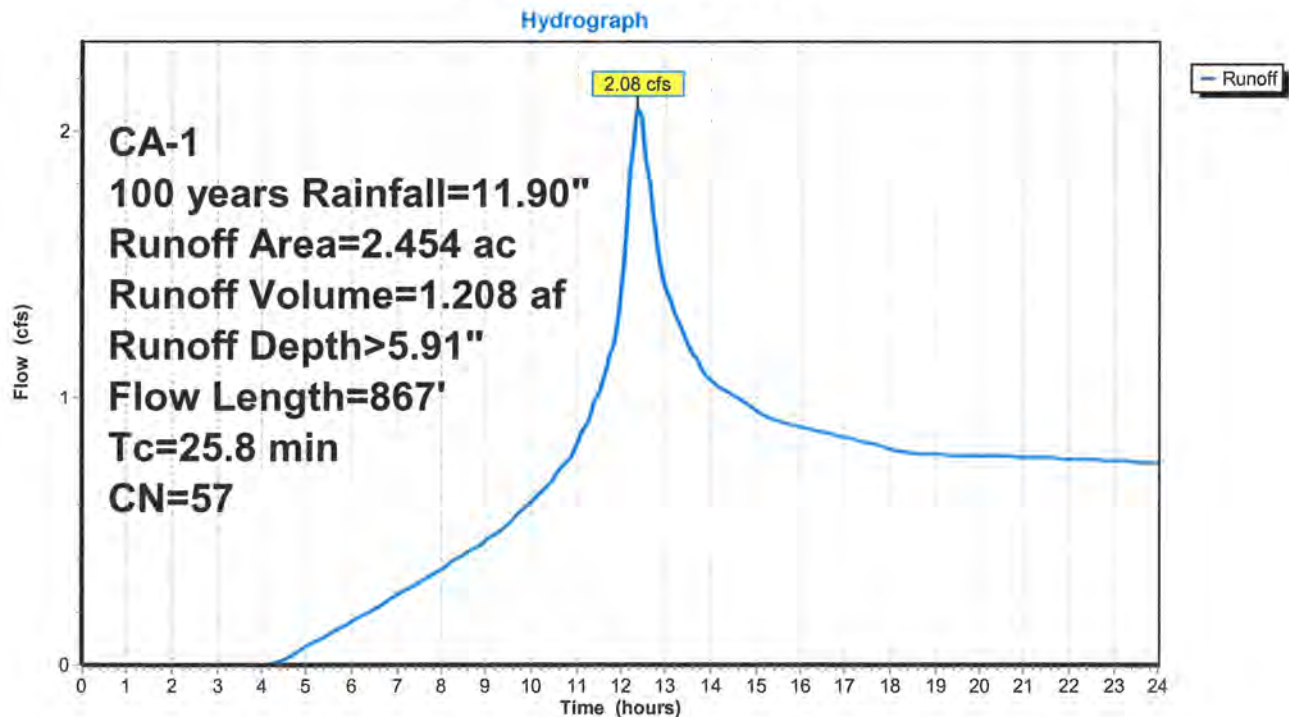
Runoff = 2.08 cfs @ 12.37 hrs, Volume= 1.208 af, Depth> 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 years Rainfall=11.90"

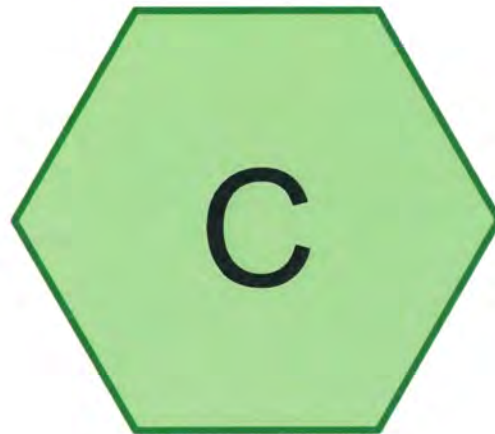
Area (ac)	CN	Description
1.437	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 0.937	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

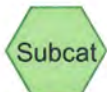
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Pre WS B</b> Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Pre WS B</b> Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Pre WS B</b> Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: PRE WS B**





# PRE WS C



## Routing Diagram for PRE WS C R1

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**PRE WS C R1**

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CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment C: PRE WS C**

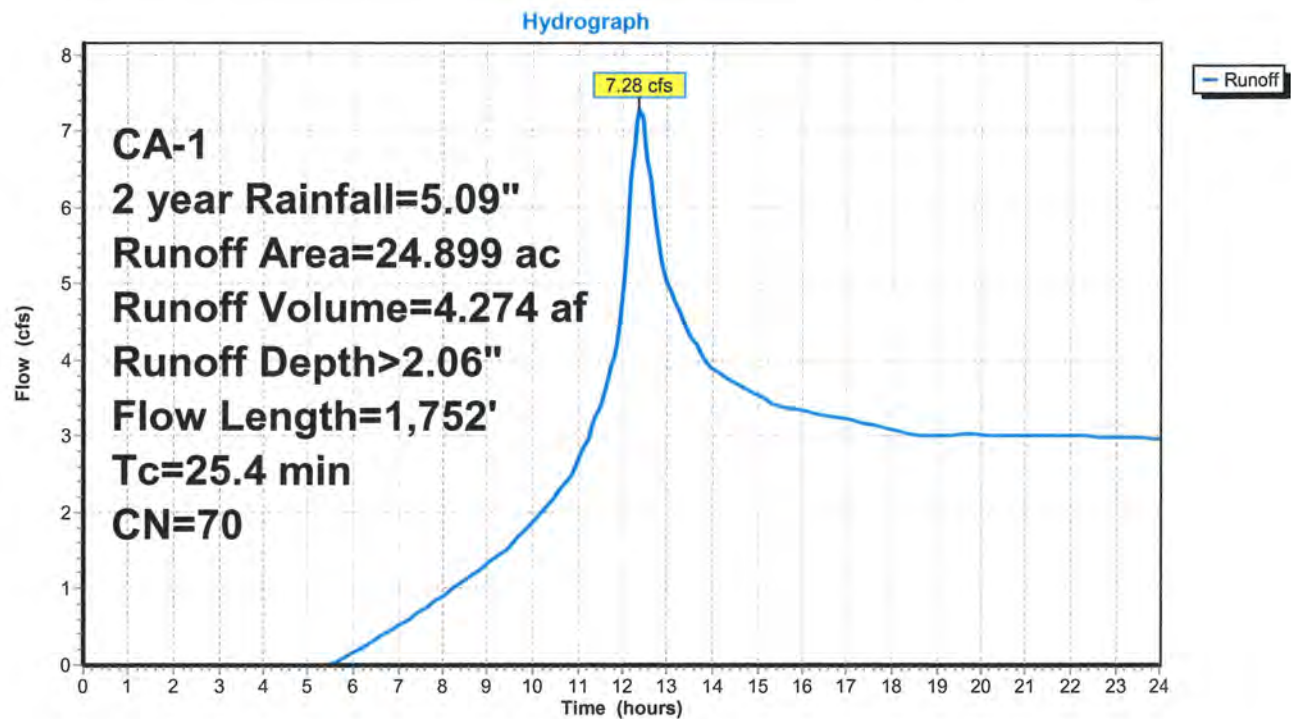
Runoff = 7.28 cfs @ 12.37 hrs, Volume= 4.274 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## Subcatchment C: PRE WS C



**PRE WS C R1**

CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment C: PRE WS C**

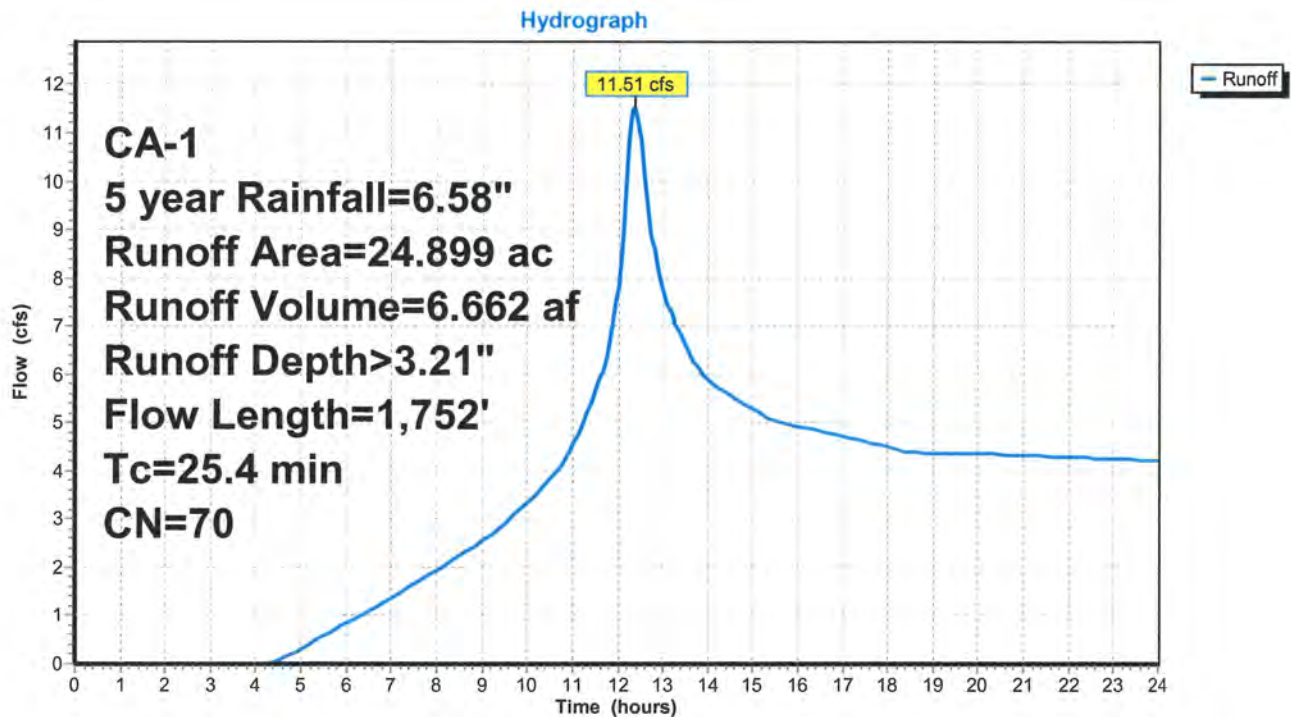
Runoff = 11.51 cfs @ 12.37 hrs, Volume= 6.662 af, Depth&gt; 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## Subcatchment C: PRE WS C



**PRE WS C R1**

CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment C: PRE WS C**

Runoff = 14.99 cfs @ 12.36 hrs, Volume= 8.662 af, Depth&gt; 4.17"

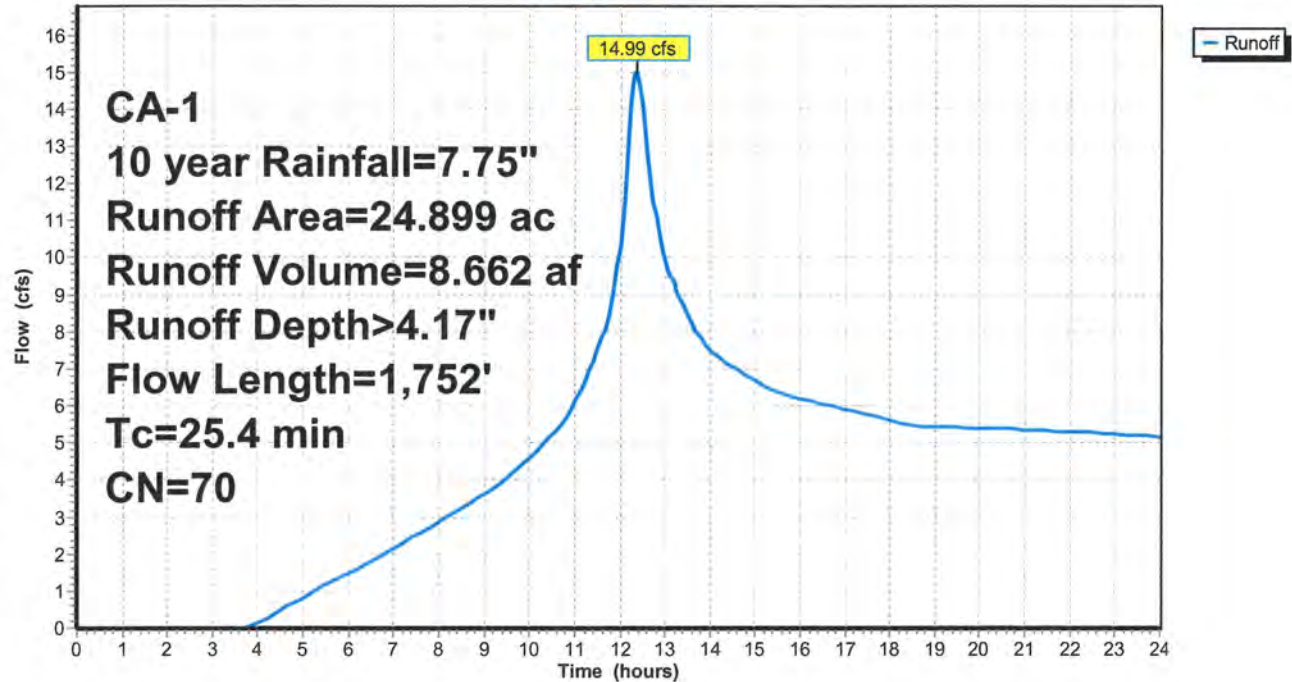
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## Subcatchment C: PRE WS C

Hydrograph



**PRE WS C R1**

CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment C: PRE WS C**

Runoff = 20.12 cfs @ 12.36 hrs, Volume= 11.660 af, Depth&gt; 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

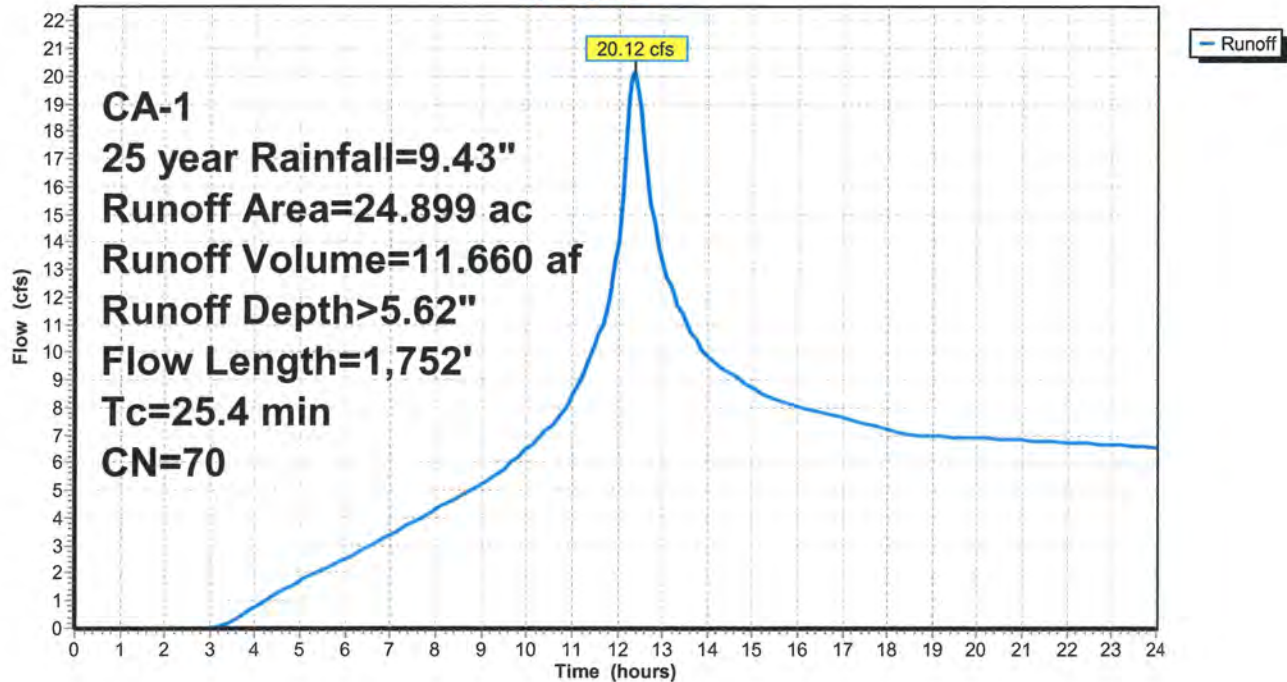
Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			



## Subcatchment C: PRE WS C

Hydrograph



**PRE WS C R1**

CA-1 50 year Rainfall=10.70"

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**Summary for Subcatchment C: PRE WS C**

Runoff = 24.05 cfs @ 12.36 hrs, Volume= 13.997 af, Depth&gt; 6.75"

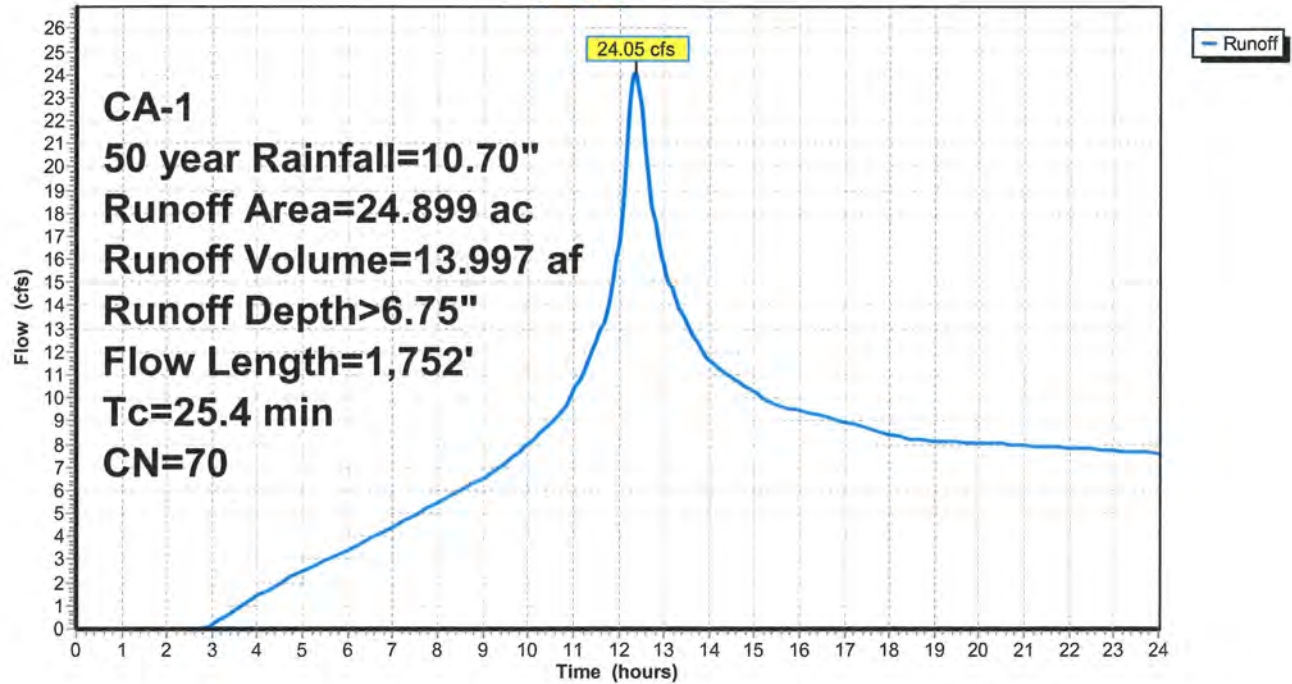
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## Subcatchment C: PRE WS C

Hydrograph



**PRE WS C R1**

CA-1 100 year Rainfall=11.90"

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**Summary for Subcatchment C: PRE WS C**

Runoff = 27.79 cfs @ 12.36 hrs, Volume= 16.246 af, Depth&gt; 7.83"

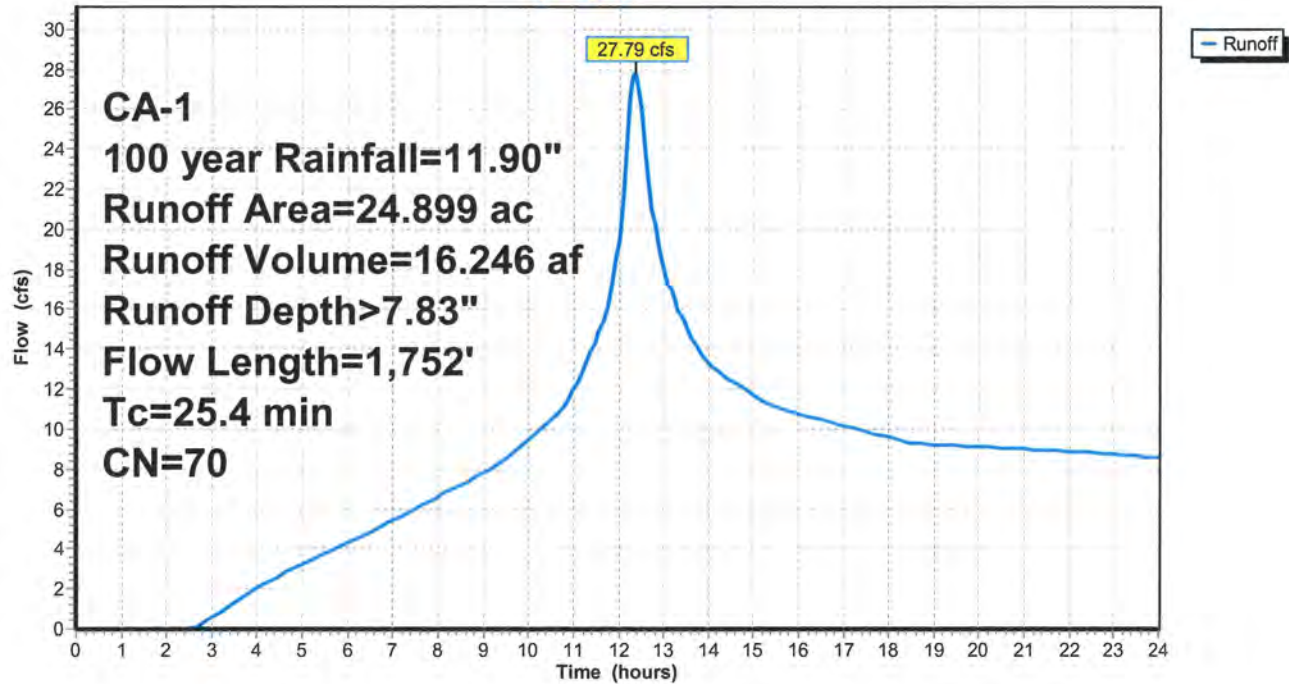
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 year Rainfall=11.90"

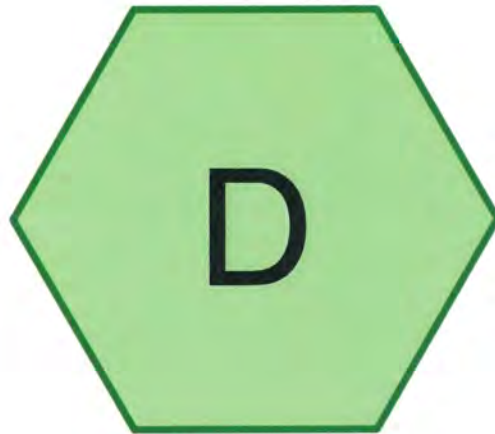
Area (ac)	CN	Description
5.834	60	Woods, Fair, HSG B
12.216	73	Woods, Fair, HSG C
0.107	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
1.893	61	>75% Grass cover, Good, HSG B
0.114	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 2.335	61	>75% Vineyard, Good, HSG B
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Pre WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Pre WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

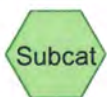
## Subcatchment C: PRE WS C

Hydrograph





PRE WS D



**Routing Diagram for PRE WS D R1**

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**PRE WS D R1**

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CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment D: PRE WS D**

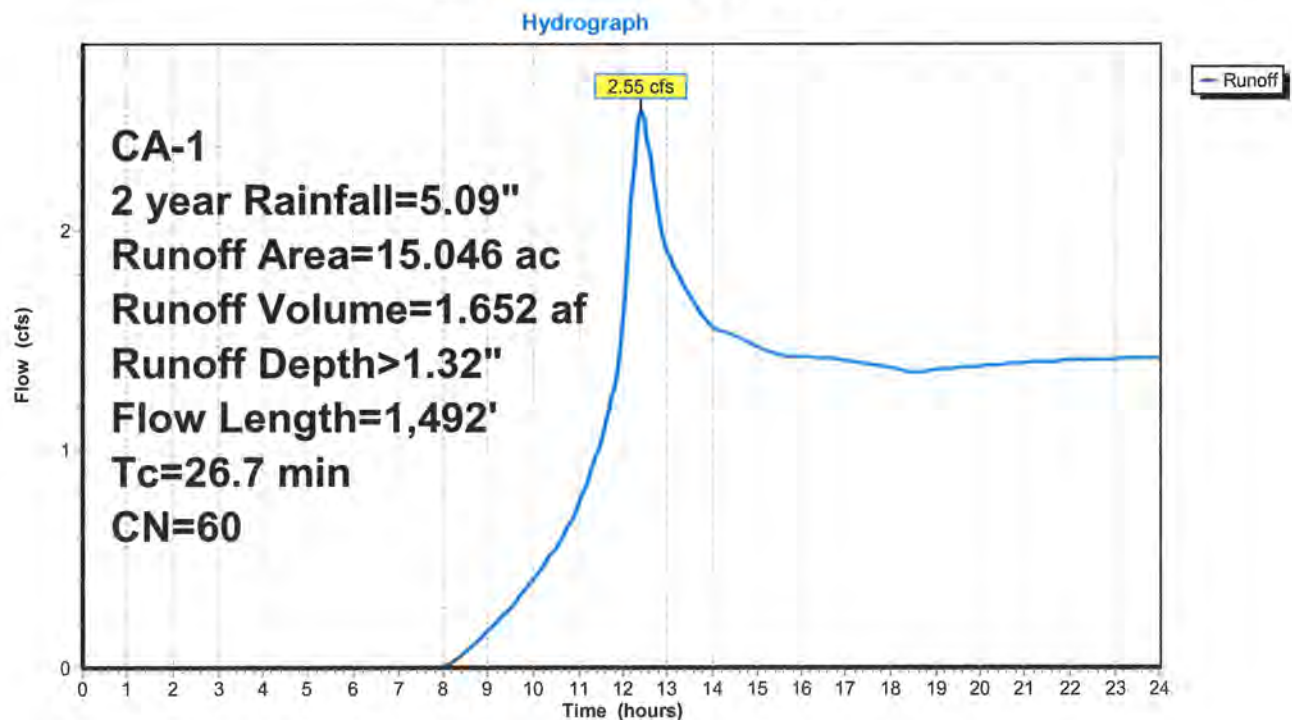
Runoff = 2.55 cfs @ 12.41 hrs, Volume= 1.652 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**

**PRE WS D R1**

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CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment D: PRE WS D**

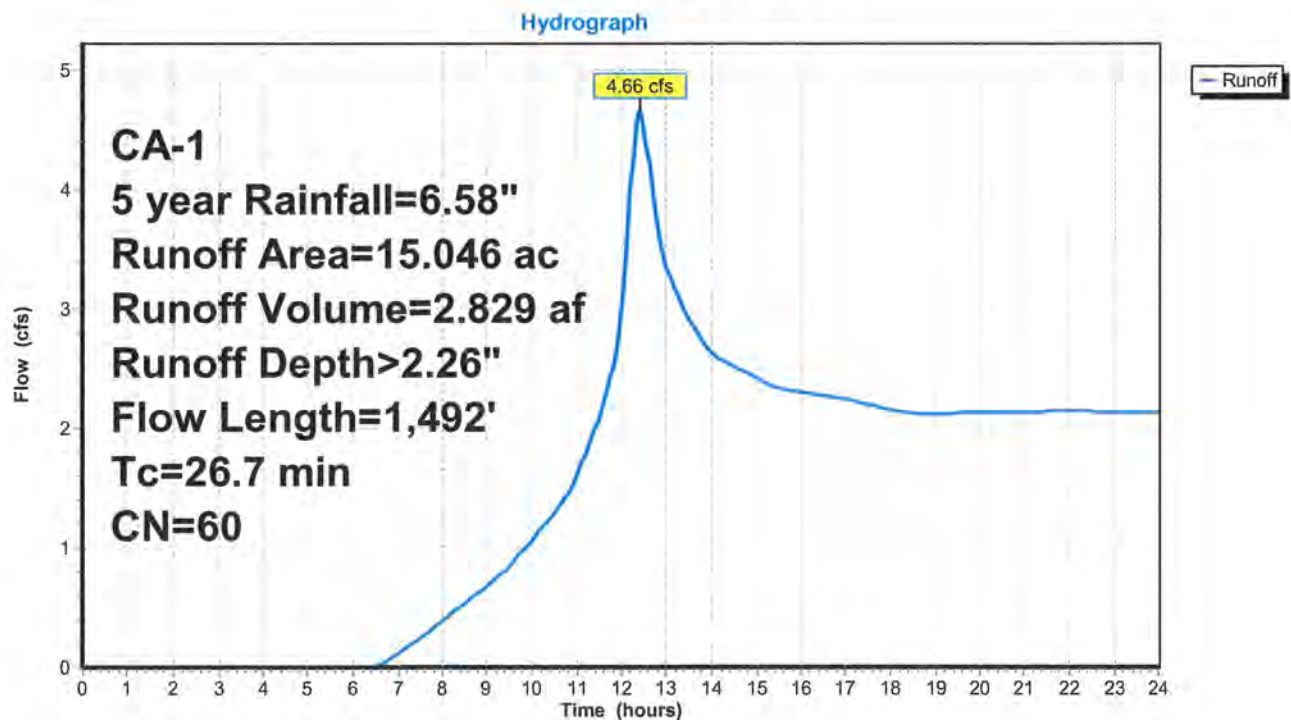
Runoff = 4.66 cfs @ 12.39 hrs, Volume= 2.829 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**



**PRE WS D R1**

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CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment D: PRE WS D**

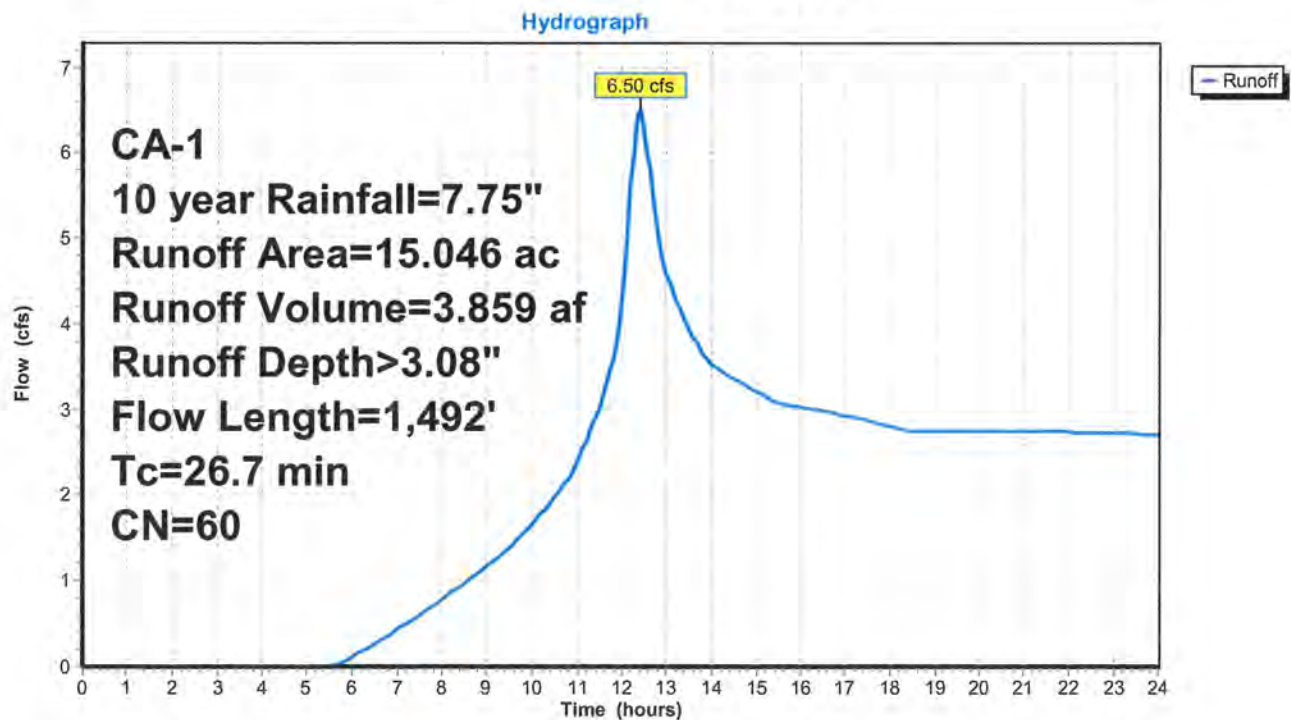
Runoff = 6.50 cfs @ 12.39 hrs, Volume= 3.859 af, Depth> 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**

**PRE WS D R1**

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CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment D: PRE WS D**

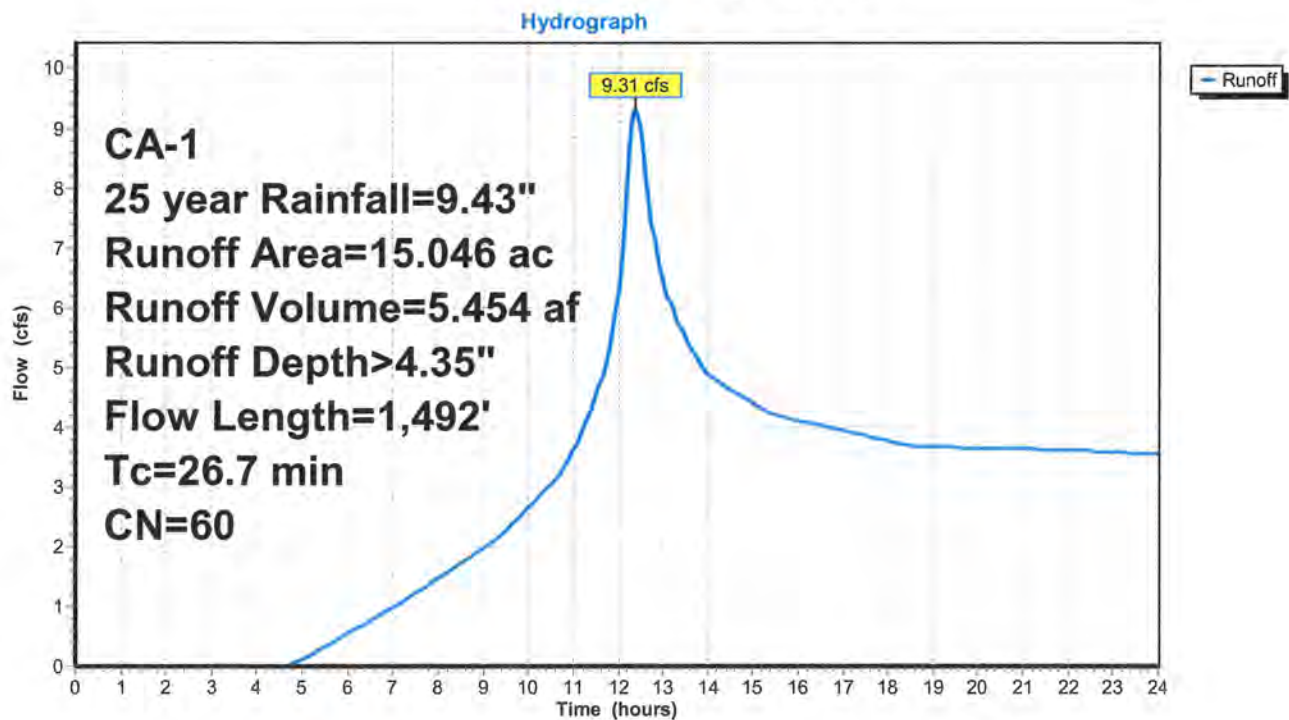
Runoff = 9.31 cfs @ 12.38 hrs, Volume= 5.454 af, Depth> 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**

**PRE WS D R1**

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CA-1 50 year Rainfall=10.70"

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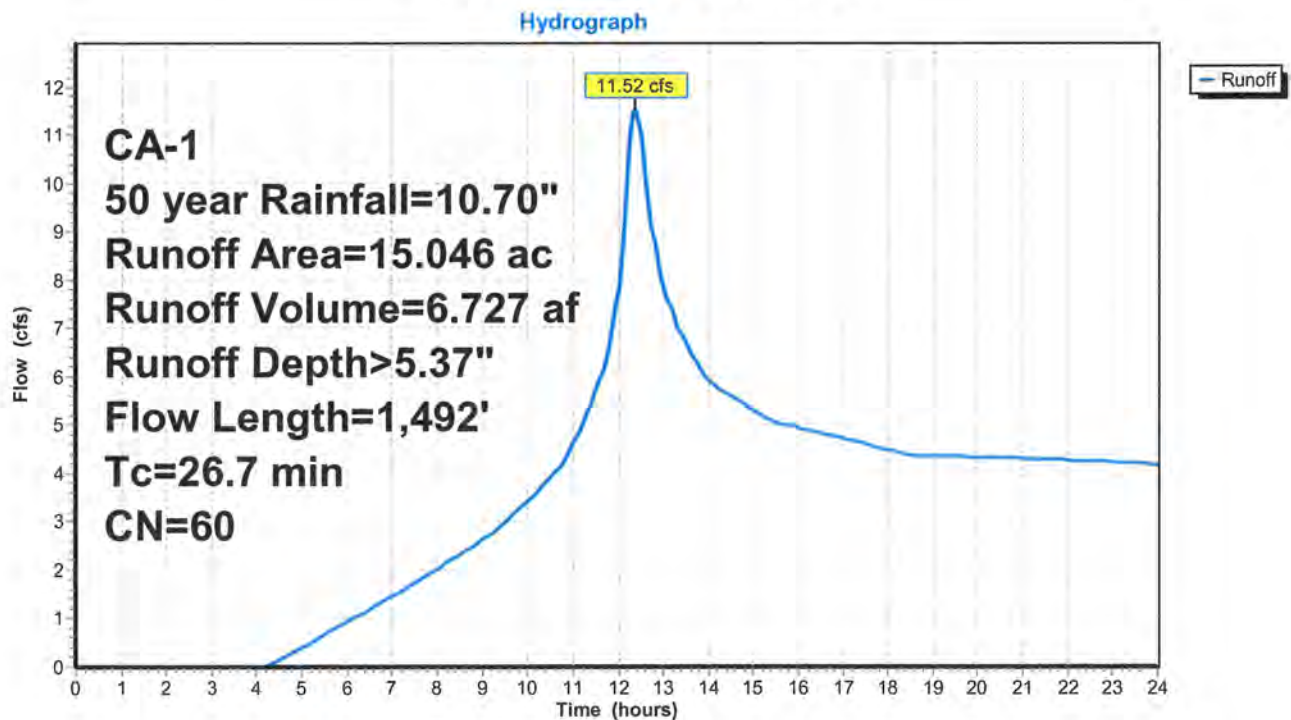
**Summary for Subcatchment D: PRE WS D**

Runoff = 11.52 cfs @ 12.38 hrs, Volume= 6.727 af, Depth> 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**



**PRE WS D R1**

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CA-1 100 year Rainfall=11.90"

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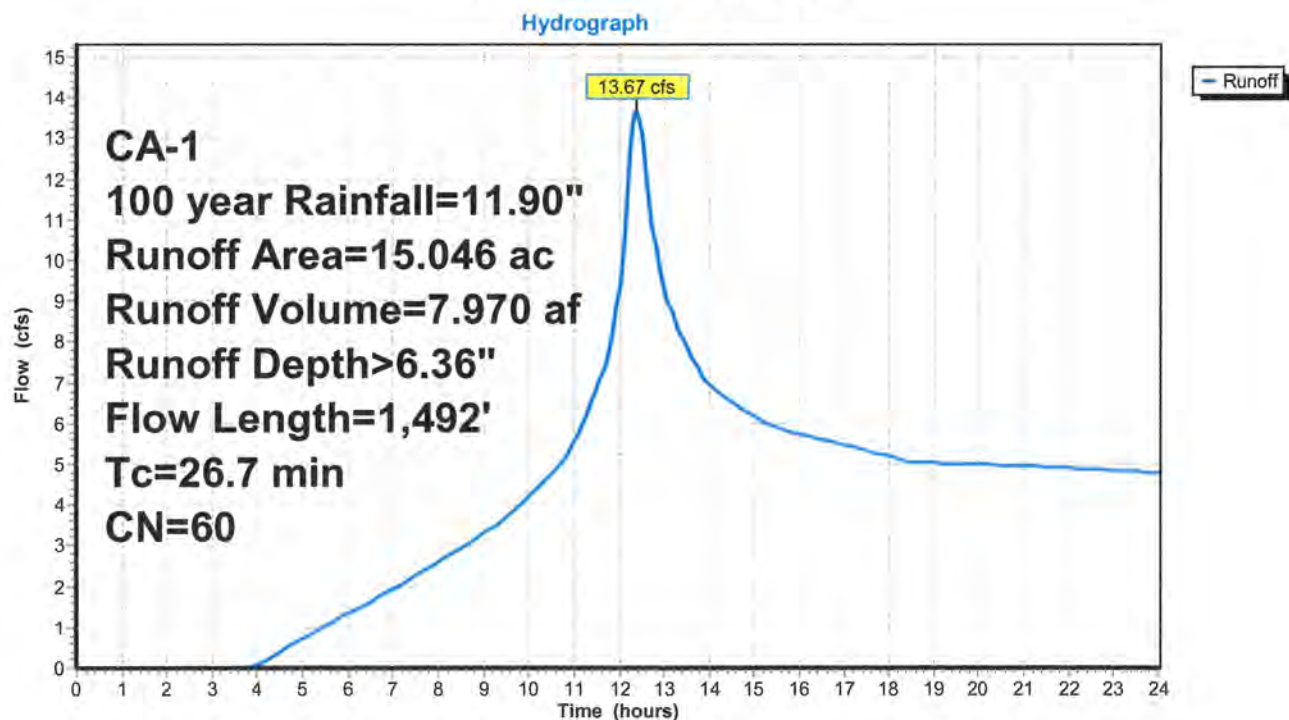
**Summary for Subcatchment D: PRE WS D**

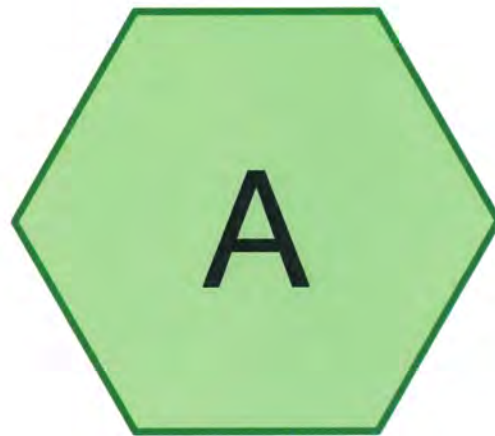
Runoff = 13.67 cfs @ 12.38 hrs, Volume= 7.970 af, Depth> 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 year Rainfall=11.90"

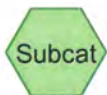
Area (ac)	CN	Description
12.607	60	Woods, Fair, HSG B
0.310	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 0.712	61	>75% Vineyard, Good, HSG B
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Pre WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Pre WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

**Subcatchment D: PRE WS D**



# POST WS A



## Routing Diagram for POST WS A R1

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**POST WS A R1**

CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment A: POST WS A**

Runoff = 3.62 cfs @ 12.79 hrs, Volume= 2.727 af, Depth&gt; 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## POST WS A R1

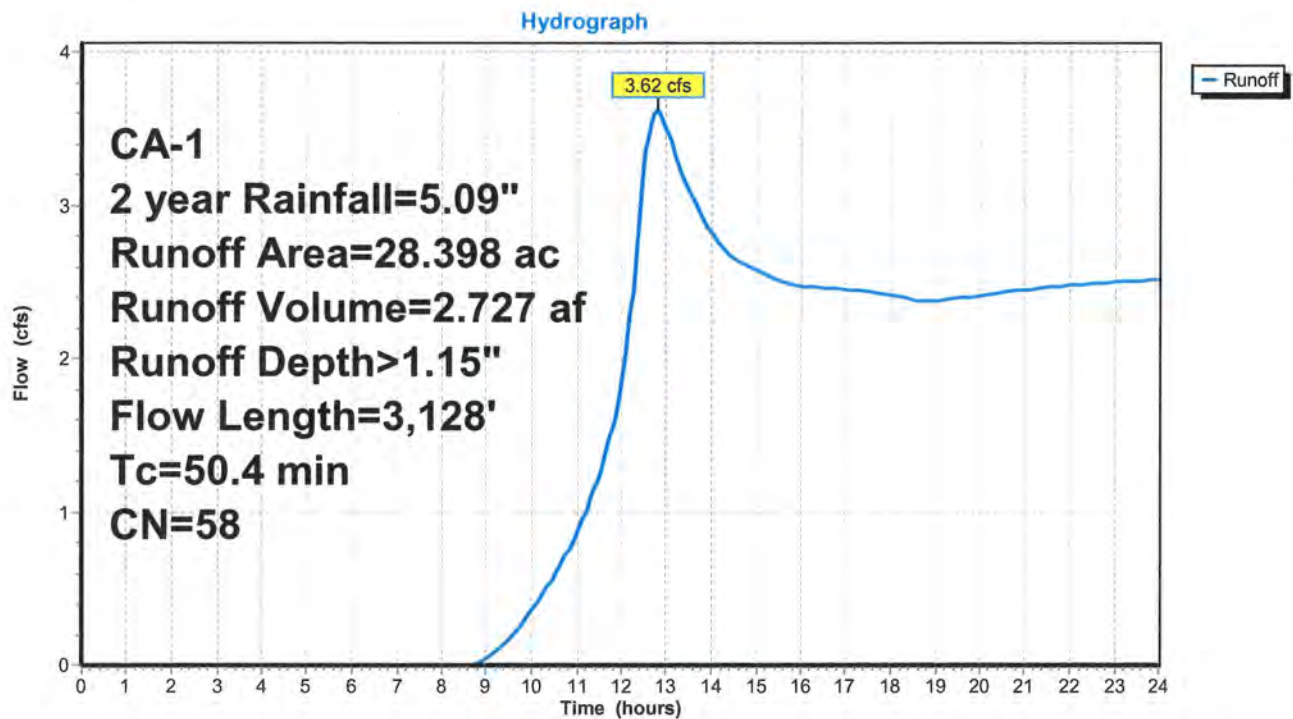
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CA-1 2 year Rainfall=5.09"

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### Subcatchment A: POST WS A



**POST WS A R1**

CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment A: POST WS A**

Runoff = 6.93 cfs @ 12.74 hrs, Volume= 4.797 af, Depth&gt; 2.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			



## POST WS A R1

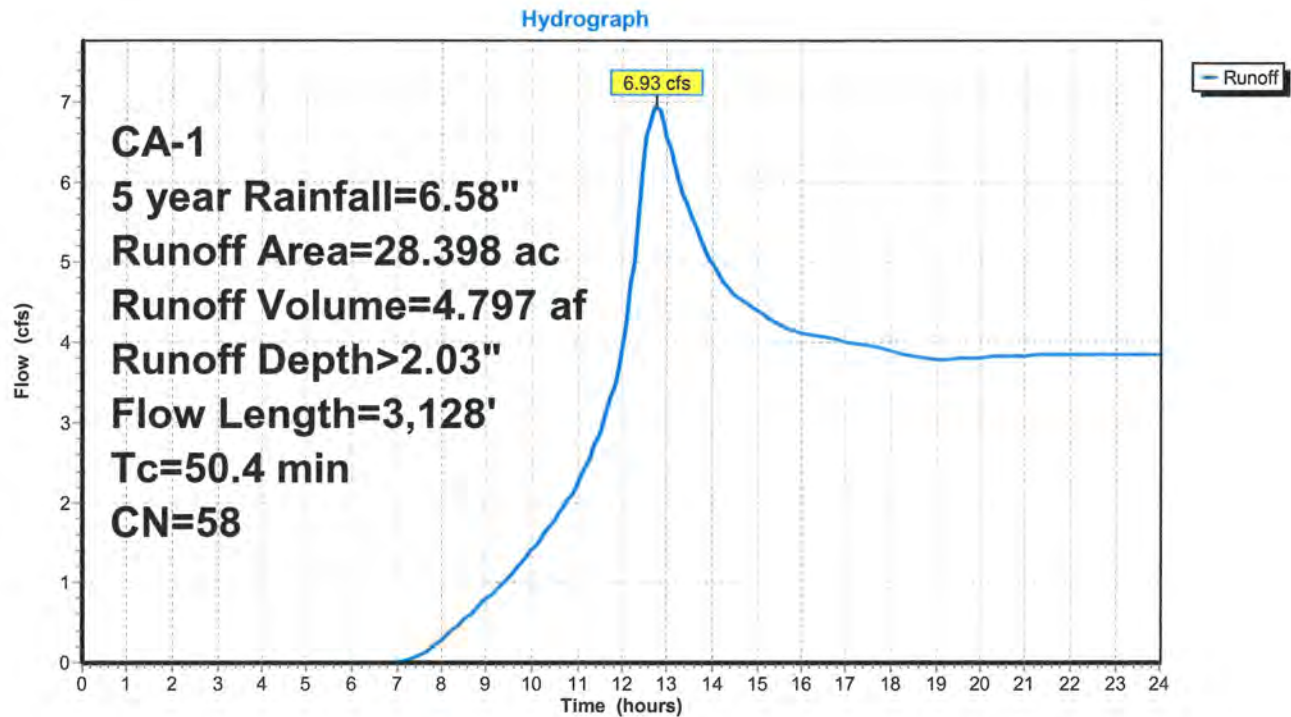
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CA-1 5 year Rainfall=6.58"

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### Subcatchment A: POST WS A



**POST WS A R1**

CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment A: POST WS A**

Runoff = 9.85 cfs @ 12.72 hrs, Volume= 6.632 af, Depth&gt; 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## POST WS A R1

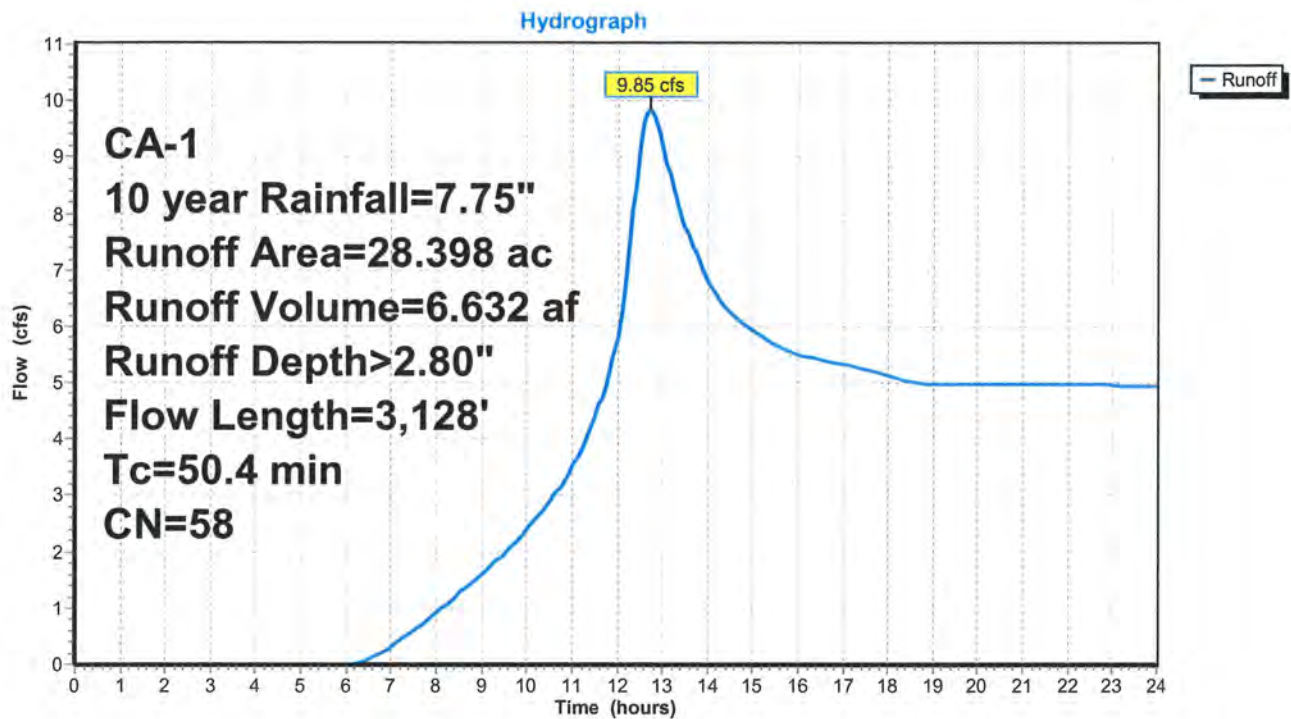
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CA-1 10 year Rainfall=7.75"

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### Subcatchment A: POST WS A



**POST WS A R1**

CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment A: POST WS A**

Runoff = 14.35 cfs @ 12.71 hrs, Volume= 9.498 af, Depth&gt; 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## POST WS A R1

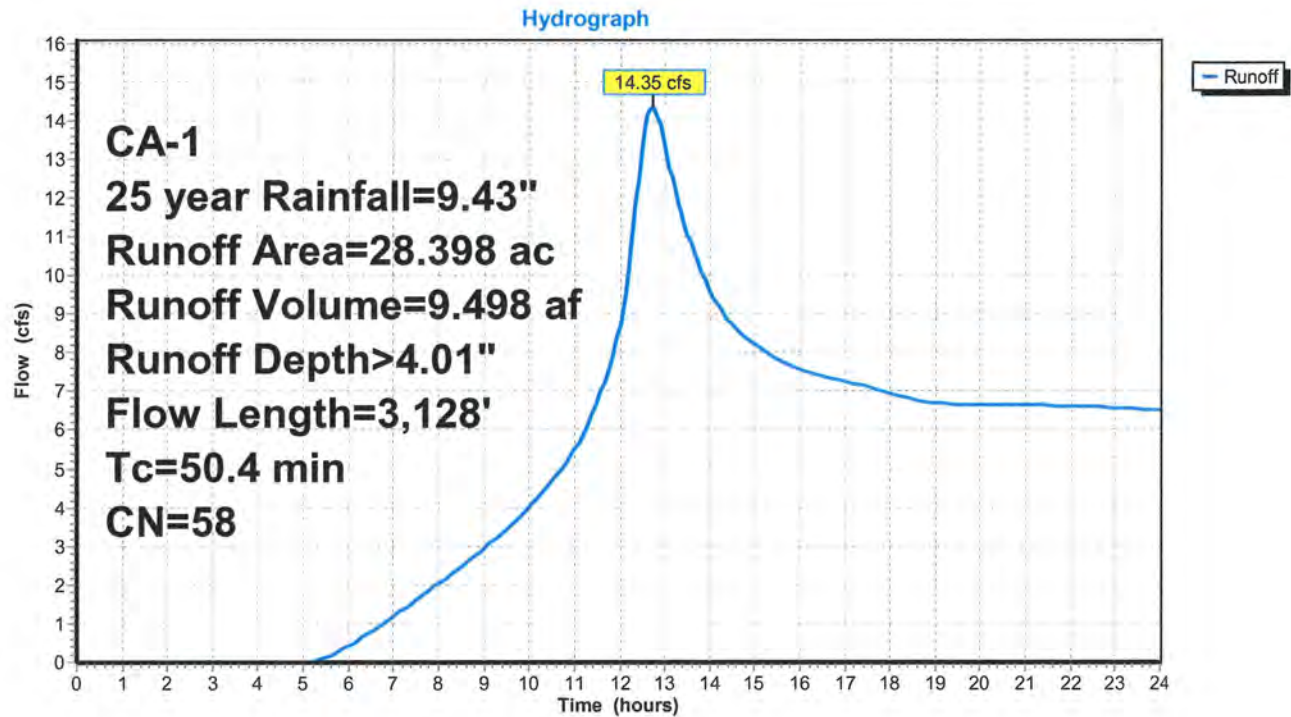
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CA-1 25 year Rainfall=9.43"

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### Subcatchment A: POST WS A



**POST WS A R1**

CA-1 50 year Rainfall=10.70"

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**Summary for Subcatchment A: POST WS A**

Runoff = 17.93 cfs @ 12.71 hrs, Volume= 11.801 af, Depth&gt; 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b>
					Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b>
					Woodland Kv= 5.0 fps
50.4	3,128	Total			

## POST WS A R1

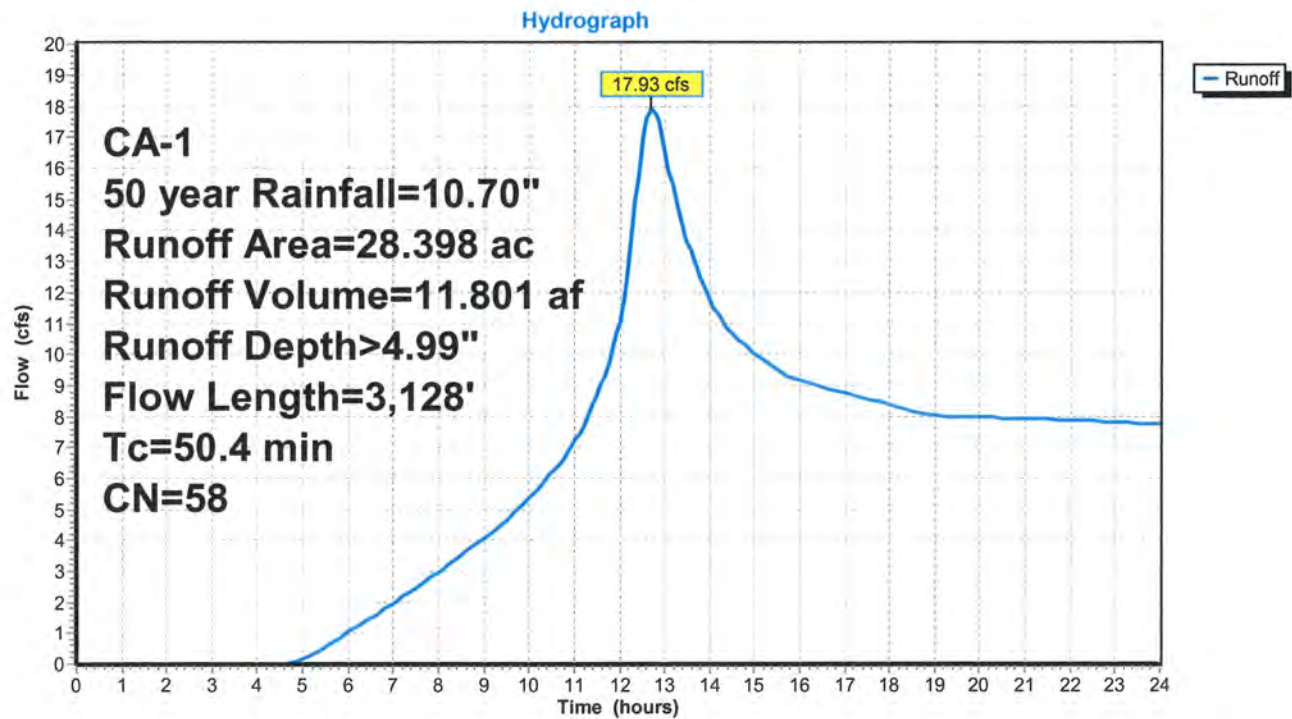
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CA-1 50 year Rainfall=10.70"

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### Subcatchment A: POST WS A



**POST WS A R1**

CA-1 100 year Rainfall=11.90"

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**Summary for Subcatchment A: POST WS A**

Runoff = 21.40 cfs @ 12.70 hrs, Volume= 14.059 af, Depth&gt; 5.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 year Rainfall=11.90"

Area (ac)	CN	Description
18.240	55	Woods, Good, HSG B
1.208	70	Woods, Good, HSG C
1.120	48	Brush, Good, HSG B
0.202	61	>75% Grass cover, Good, HSG B
1.248	74	>75% Grass cover, Good, HSG C
0.124	85	Gravel roads, HSG B
0.115	89	Gravel roads, HSG C
* 5.451	61	>75% Vineyard, Good, HSG B
* 0.690	75	>75% Vineyard, Good, HSG C
28.398	58	Weighted Average
28.398		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.1600	0.22		<b>Sheet Flow, Post WS A</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.1	184	0.0815	1.43		<b>Shallow Concentrated Flow, Post WS A</b> Woodland Kv= 5.0 fps
3.7	633	0.3333	2.89		<b>Shallow Concentrated Flow, Post WS A</b> Woodland Kv= 5.0 fps
37.2	2,211	0.0393	0.99		<b>Shallow Concentrated Flow, Post WS A</b> Woodland Kv= 5.0 fps
50.4	3,128	Total			



## POST WS A R1

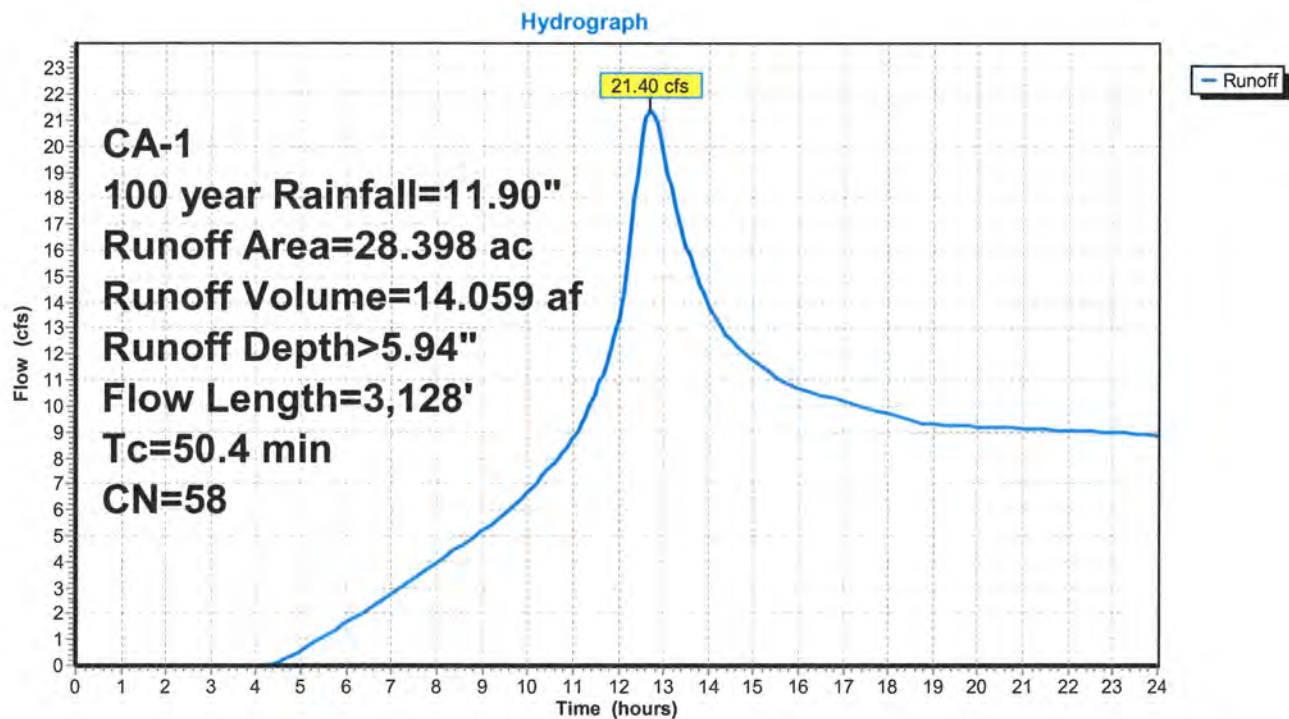
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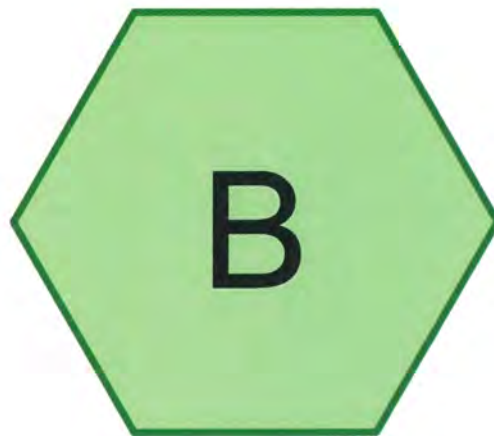
CA-1 100 year Rainfall=11.90"

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### Subcatchment A: POST WS A





# POST WS B



## Routing Diagram for POST WS B R1

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**POST WS B R1**

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CA-1 2 years Rainfall=5.09"

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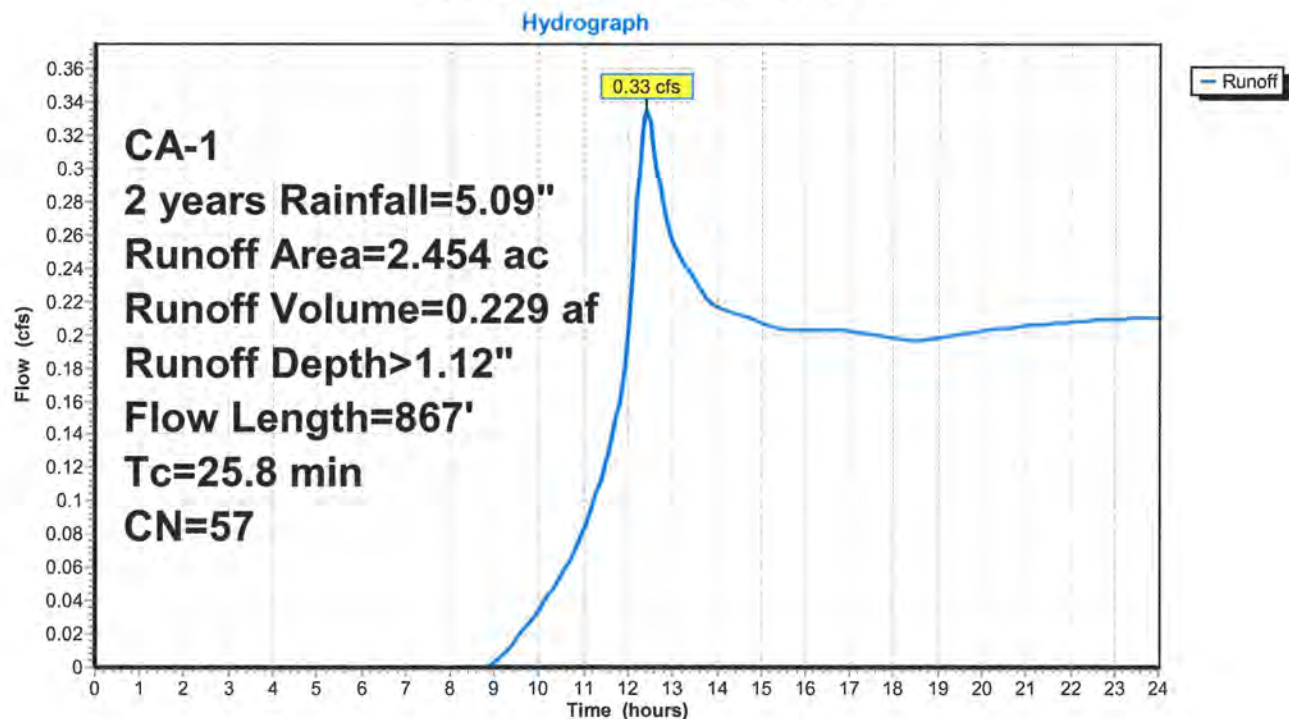
**Summary for Subcatchment B: POST WS B**

Runoff = 0.33 cfs @ 12.40 hrs, Volume= 0.229 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 years Rainfall=5.09"

Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**

**POST WS B R1**

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CA-1 5 years Rainfall=6.58"

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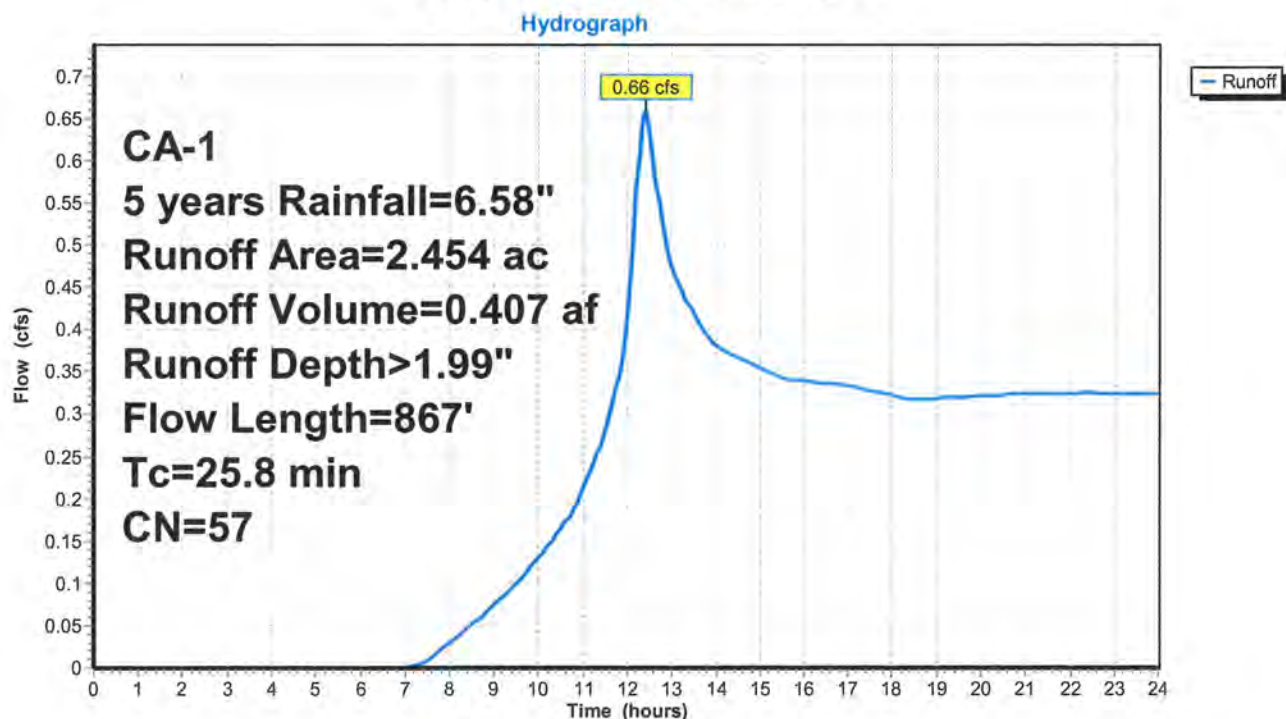
**Summary for Subcatchment B: POST WS B**

Runoff = 0.66 cfs @ 12.39 hrs, Volume= 0.407 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 years Rainfall=6.58"

Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**



**POST WS B R1**

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CA-1 10 years Rainfall=7.75"

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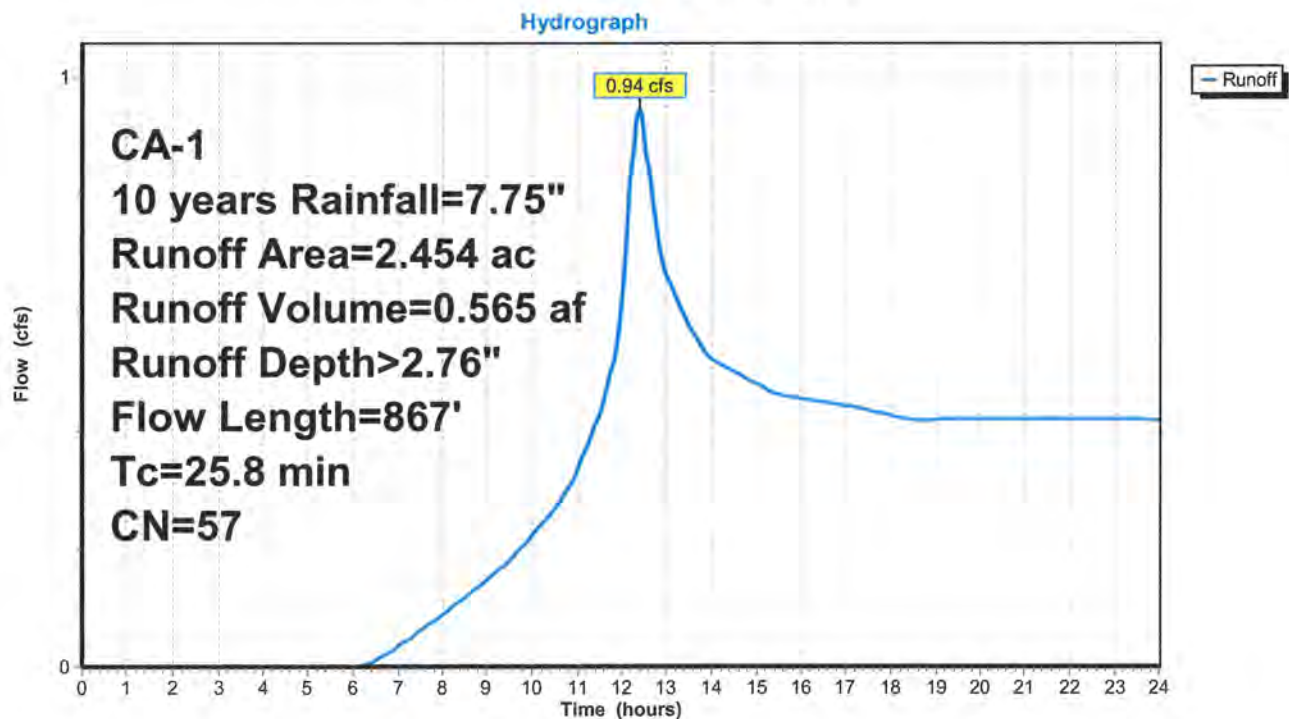
**Summary for Subcatchment B: POST WS B**

Runoff = 0.94 cfs @ 12.38 hrs, Volume= 0.565 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 CA-1 10 years Rainfall=7.75"

Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**

**POST WS B R1**

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CA-1 25 years Rainfall=9.43"

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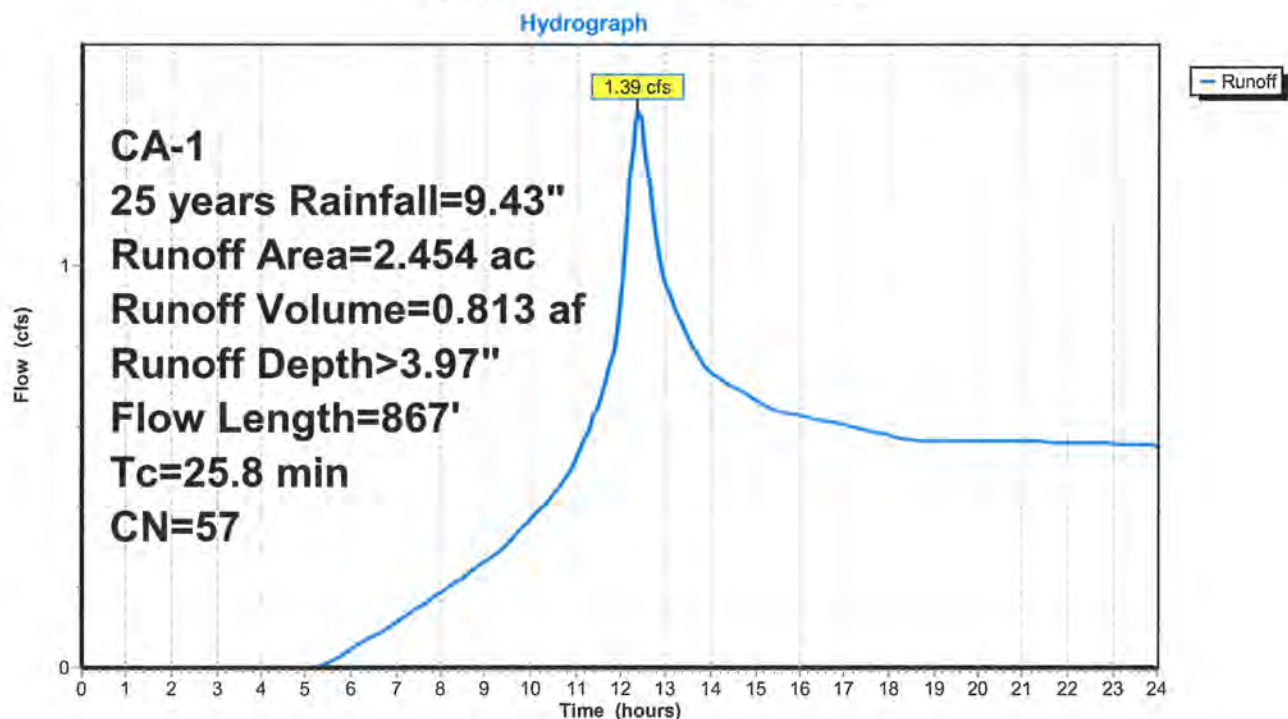
**Summary for Subcatchment B: POST WS B**

Runoff = 1.39 cfs @ 12.37 hrs, Volume= 0.813 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 years Rainfall=9.43"

Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**



**POST WS B R1**

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CA-1 50 years Rainfall=10.70"

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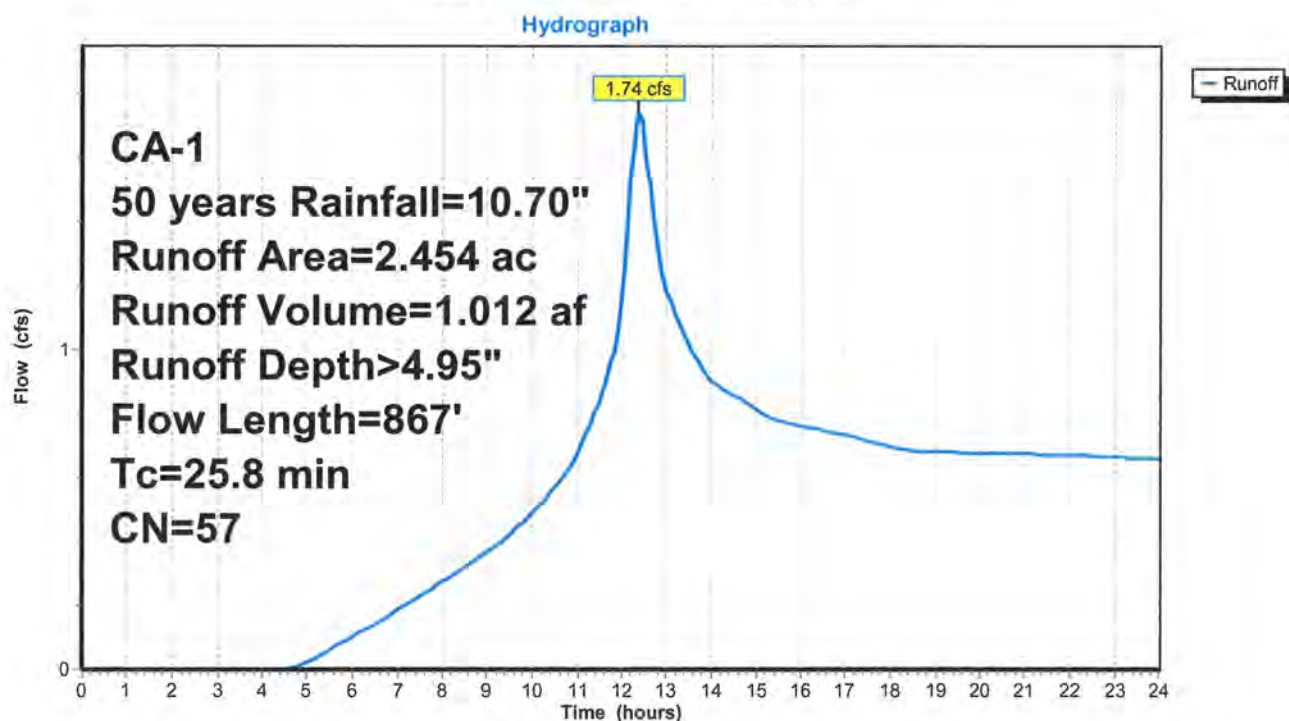
**Summary for Subcatchment B: POST WS B**

Runoff = 1.74 cfs @ 12.37 hrs, Volume= 1.012 af, Depth> 4.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 CA-1 50 years Rainfall=10.70"

Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**

**POST WS B R1**

CA-1 100 years Rainfall=11.90"

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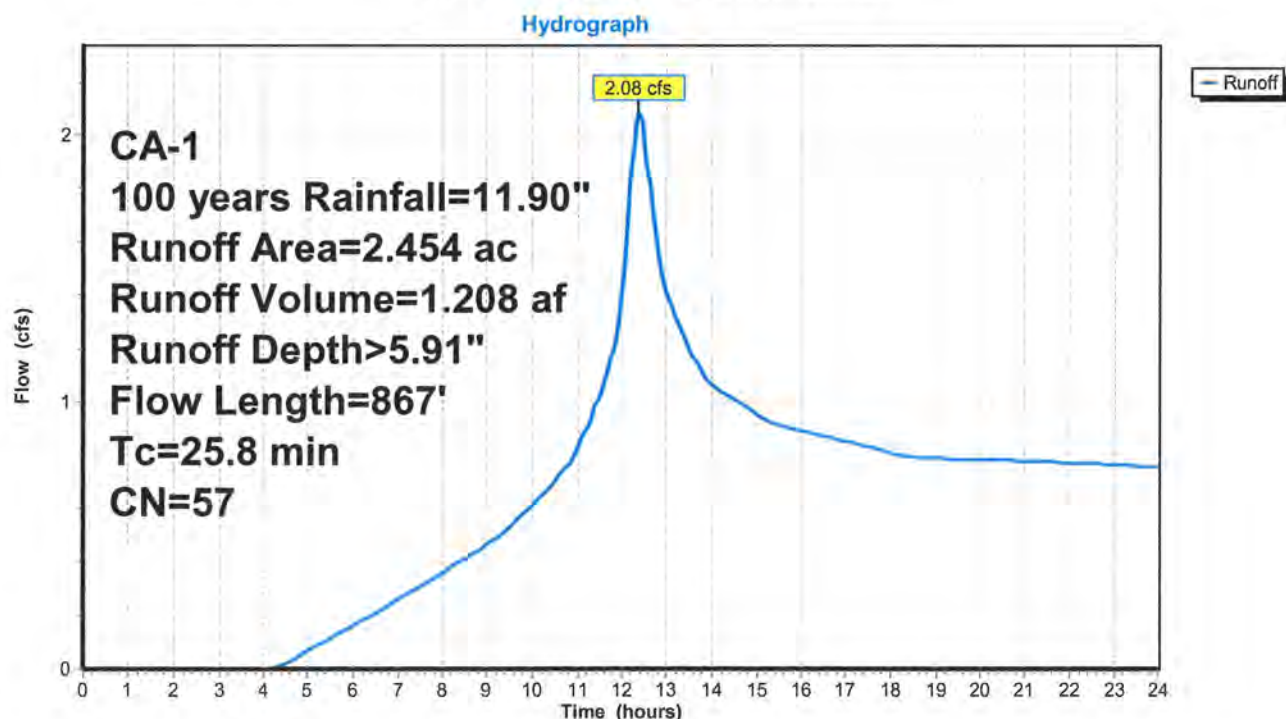
**Summary for Subcatchment B: POST WS B**

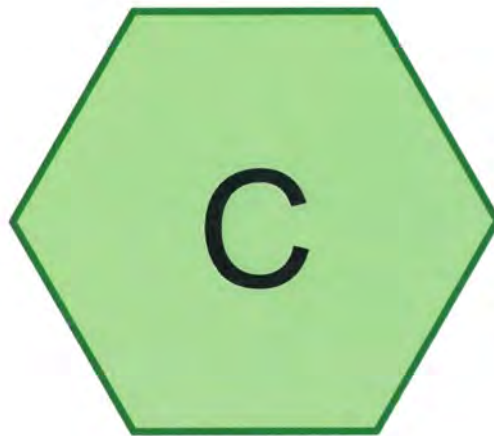
Runoff = 2.08 cfs @ 12.37 hrs, Volume= 1.208 af, Depth&gt; 5.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 years Rainfall=11.90"

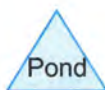
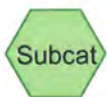
Area (ac)	CN	Description
1.288	55	Woods, Good, HSG B
0.080	48	Brush, Good, HSG B
* 1.086	61	>75% Vineyard, Good, HSG B
2.454	57	Weighted Average
2.454		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.0600	0.15		<b>Sheet Flow, Post WS B</b>
					Grass: Bermuda n= 0.410 P2= 5.09"
0.4	66	0.1969	3.11		<b>Shallow Concentrated Flow, Post WS B</b>
					Short Grass Pasture Kv= 7.0 fps
14.2	701	0.0271	0.82		<b>Shallow Concentrated Flow, Post WS B</b>
					Woodland Kv= 5.0 fps
25.8	867	Total			

**Subcatchment B: POST WS B**



# POST WS C



## Routing Diagram for POST WS C R1

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**POST WS C R1**

CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment C: POST WS C**

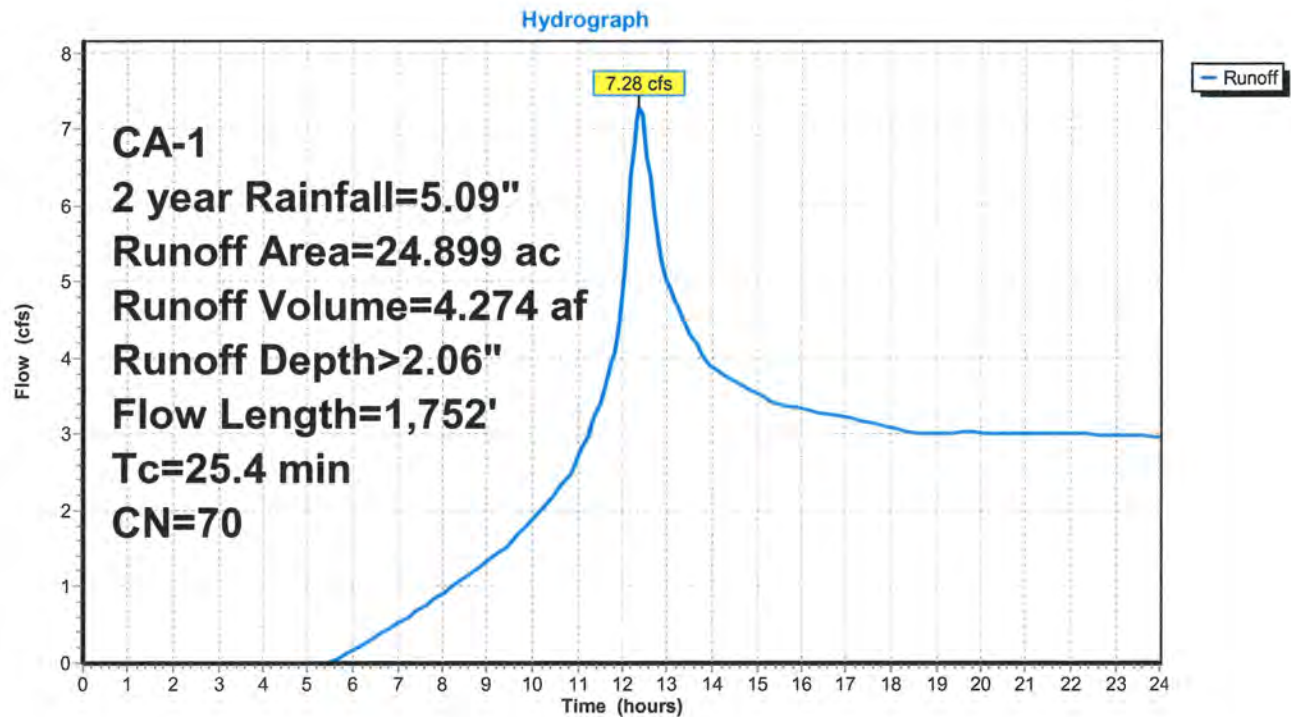
Runoff = 7.28 cfs @ 12.37 hrs, Volume= 4.274 af, Depth&gt; 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

Subcatchment C: POST WS C



**POST WS C R1**

CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment C: POST WS C**

Runoff = 11.51 cfs @ 12.37 hrs, Volume= 6.662 af, Depth&gt; 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			



# POST WS C R1

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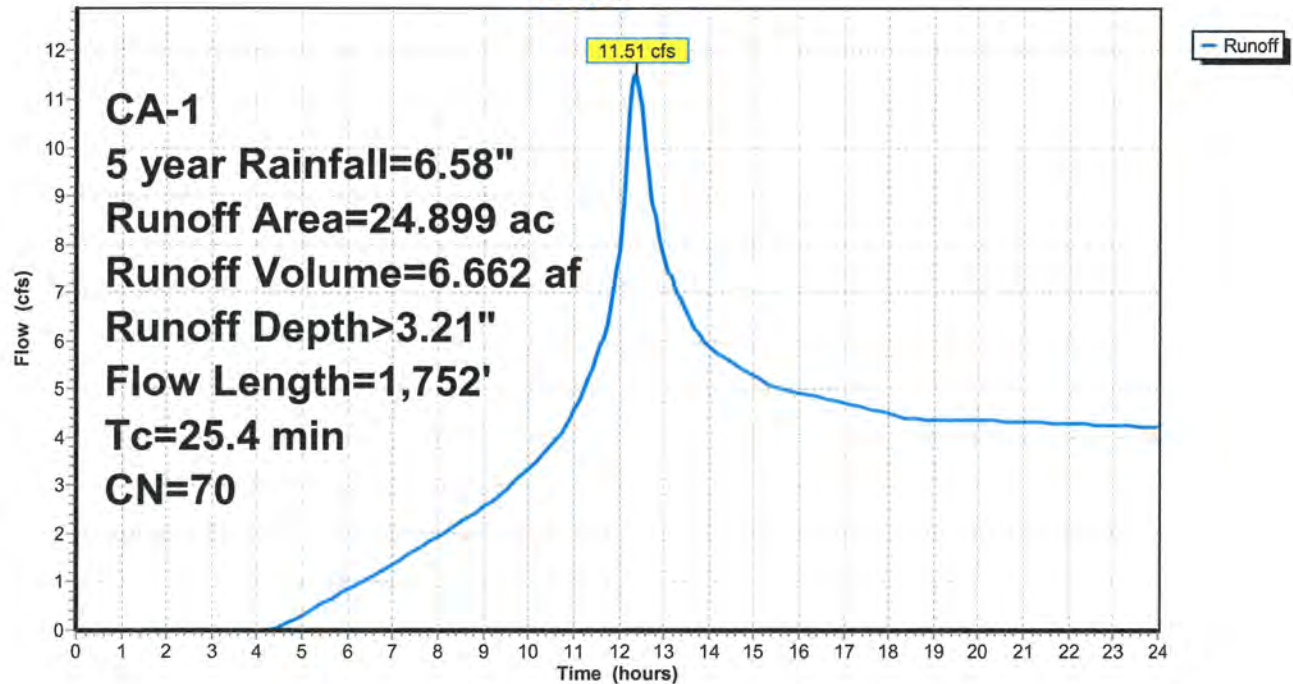
CA-1 5 year Rainfall=6.58"

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## Subcatchment C: POST WS C

Hydrograph



**POST WS C R1**

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CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment C: POST WS C**

Runoff = 14.99 cfs @ 12.36 hrs, Volume= 8.662 af, Depth&gt; 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## POST WS C R1

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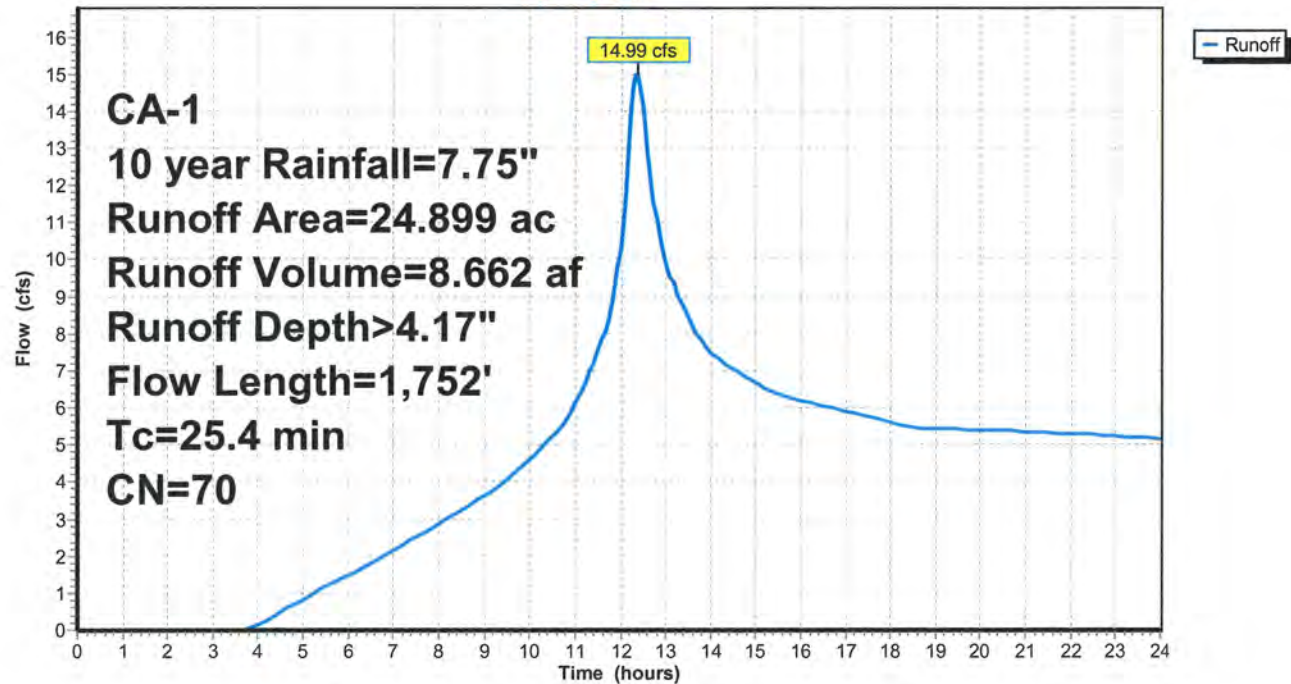
CA-1 10 year Rainfall=7.75"

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### Subcatchment C: POST WS C

Hydrograph



**POST WS C R1**

CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment C: POST WS C**

Runoff = 20.12 cfs @ 12.36 hrs, Volume= 11.660 af, Depth&gt; 5.62"

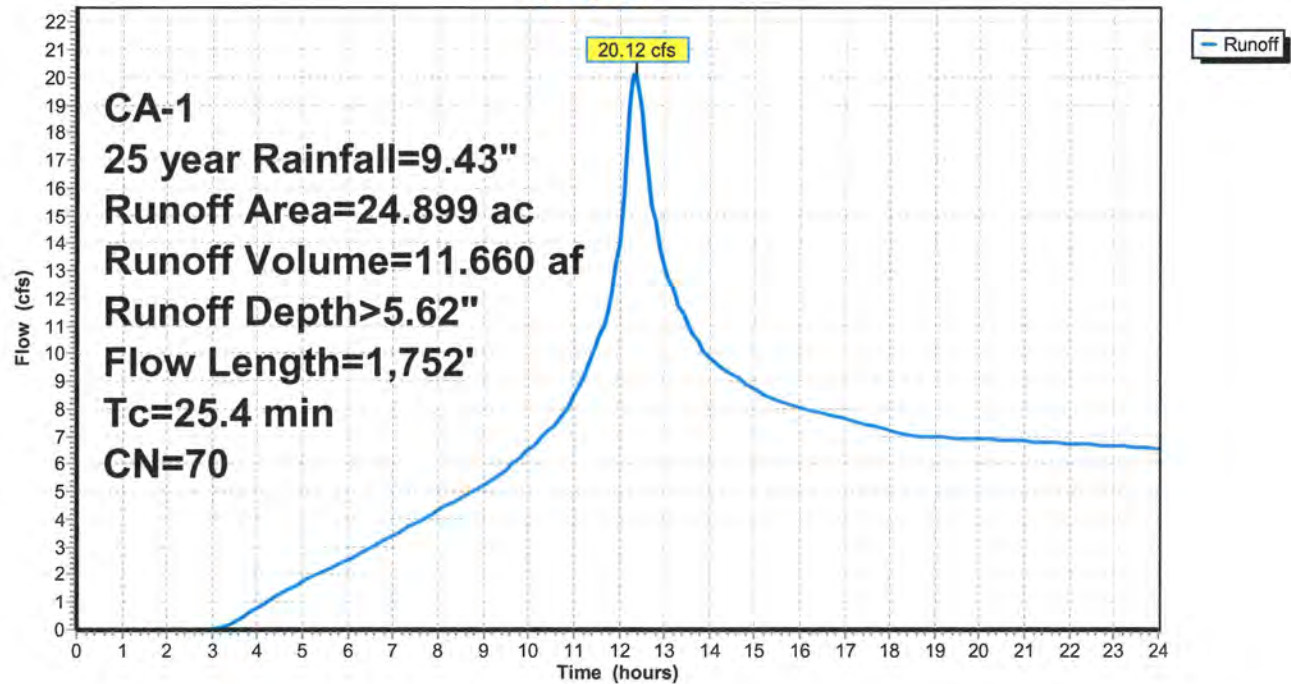
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

### Subcatchment C: POST WS C

Hydrograph



**POST WS C R1**

CA-1 50 year Rainfall=10.70"

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**Summary for Subcatchment C: POST WS C**

Runoff = 24.05 cfs @ 12.36 hrs, Volume= 13.997 af, Depth&gt; 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			



## POST WS C R1

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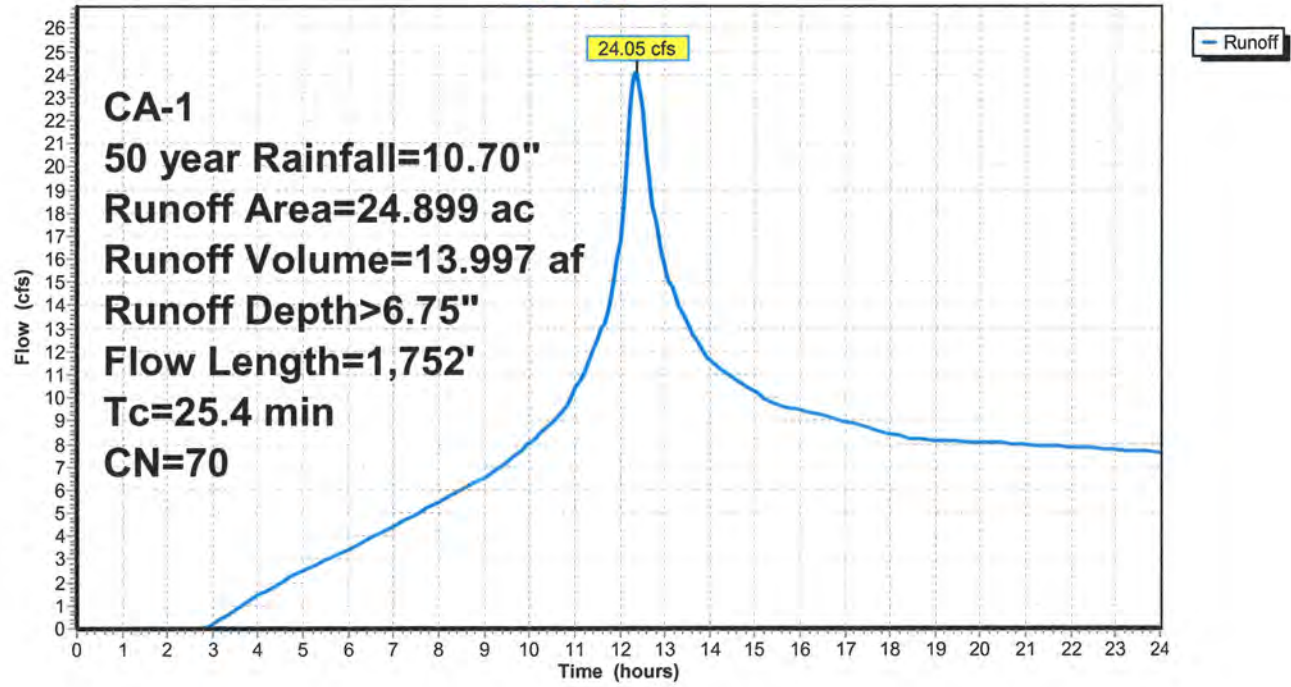
CA-1 50 year Rainfall=10.70"

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### Subcatchment C: POST WS C

Hydrograph



**POST WS C R1**

CA-1 100 year Rainfall=11.90"

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**Summary for Subcatchment C: POST WS C**

Runoff = 27.79 cfs @ 12.36 hrs, Volume= 16.246 af, Depth&gt; 7.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 year Rainfall=11.90"

Area (ac)	CN	Description
2.399	60	Woods, Fair, HSG B
11.329	73	Woods, Fair, HSG C
0.068	56	Brush, Fair, HSG B
0.436	70	Brush, Fair, HSG C
0.542	61	>75% Grass cover, Good, HSG B
0.107	74	>75% Grass cover, Good, HSG C
0.080	89	Paved roads w/open ditches, 50% imp, HSG B
0.117	92	Paved roads w/open ditches, 50% imp, HSG C
0.087	98	Roofs, HSG B
0.109	98	Roofs, HSG C
1.571	98	Water Surface, HSG C
* 7.160	61	>75% Vineyard, Good, HSG B
* 0.894	75	>75% Vineyard, Good, HSG C
24.899	70	Weighted Average
23.033		92.51% Pervious Area
1.865		7.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.1000	0.19		<b>Sheet Flow, Post WS C</b> Woods: Light underbrush n= 0.400 P2= 5.09"
2.5	261	0.1187	1.72		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
1.4	210	0.2380	2.44		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
2.3	240	0.1250	1.77		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
6.9	477	0.0524	1.14		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
3.4	464	0.2047	2.26		<b>Shallow Concentrated Flow, Post WS C</b> Woodland Kv= 5.0 fps
25.4	1,752	Total			

## POST WS C R1

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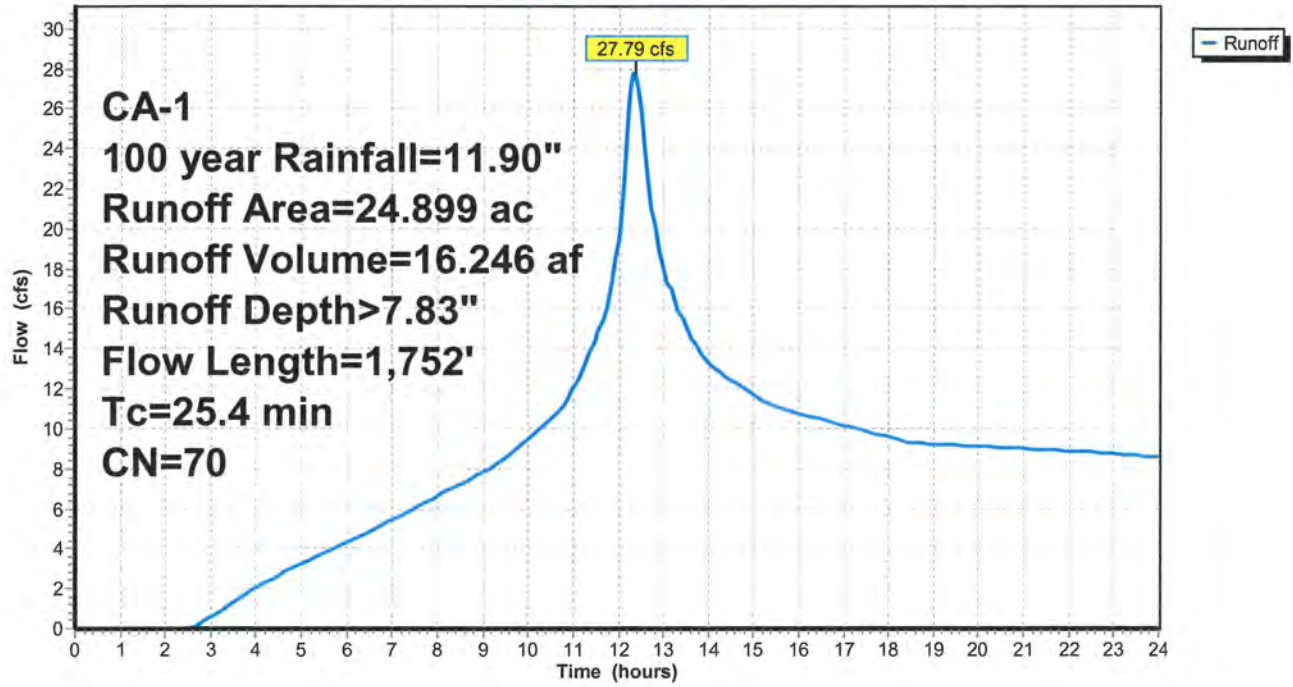
CA-1 100 year Rainfall=11.90"

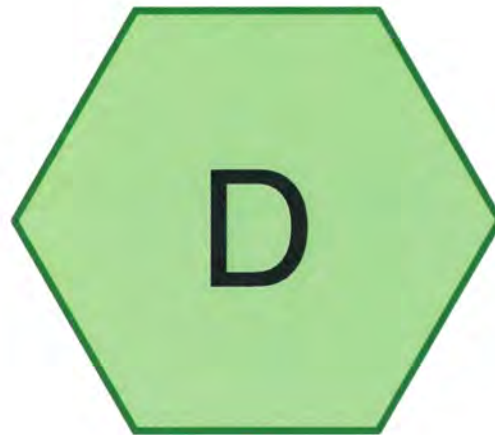
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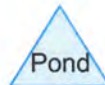
### Subcatchment C: POST WS C

Hydrograph





# POST WS D



## Routing Diagram for POST WS D R1

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**POST WS D R1**

CA-1 2 year Rainfall=5.09"

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**Summary for Subcatchment D: POST WS D**

Runoff = 2.55 cfs @ 12.41 hrs, Volume= 1.652 af, Depth&gt; 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 2 year Rainfall=5.09"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

## POST WS D R1

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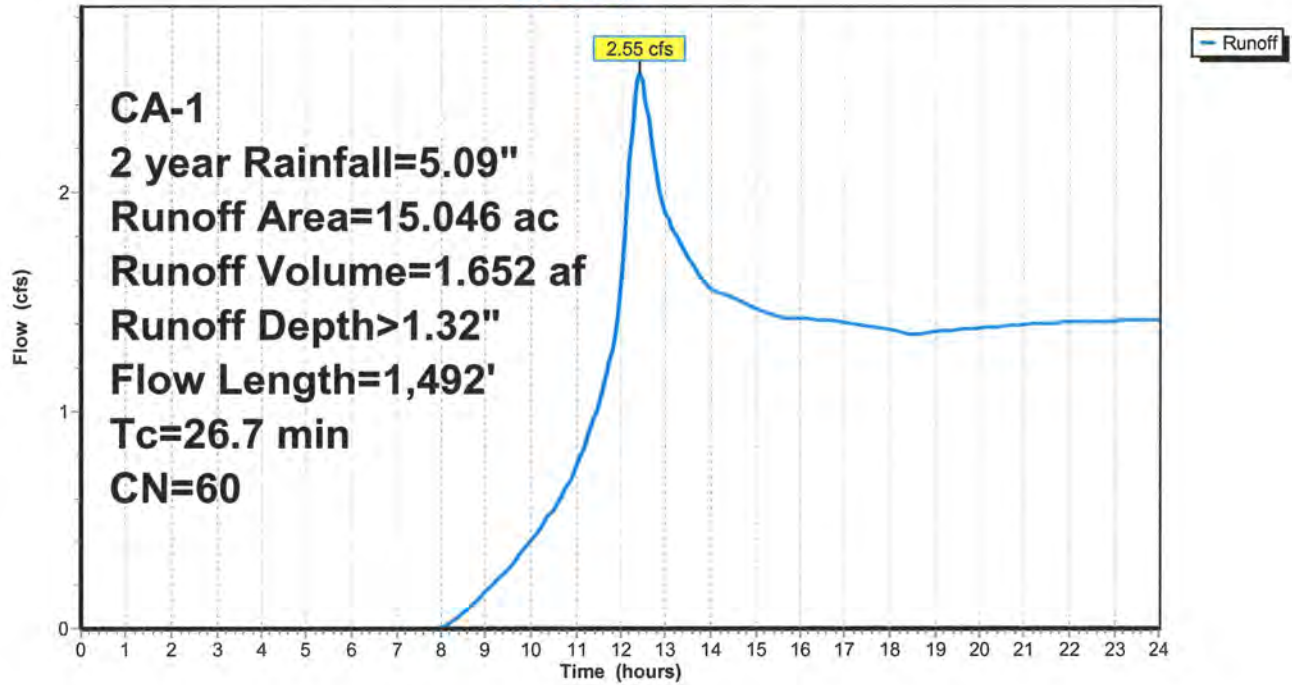
CA-1 2 year Rainfall=5.09"

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### Subcatchment D: POST WS D

Hydrograph





**POST WS D R1**

CA-1 5 year Rainfall=6.58"

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**Summary for Subcatchment D: POST WS D**

Runoff = 4.66 cfs @ 12.39 hrs, Volume= 2.829 af, Depth&gt; 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 5 year Rainfall=6.58"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

## POST WS D R1

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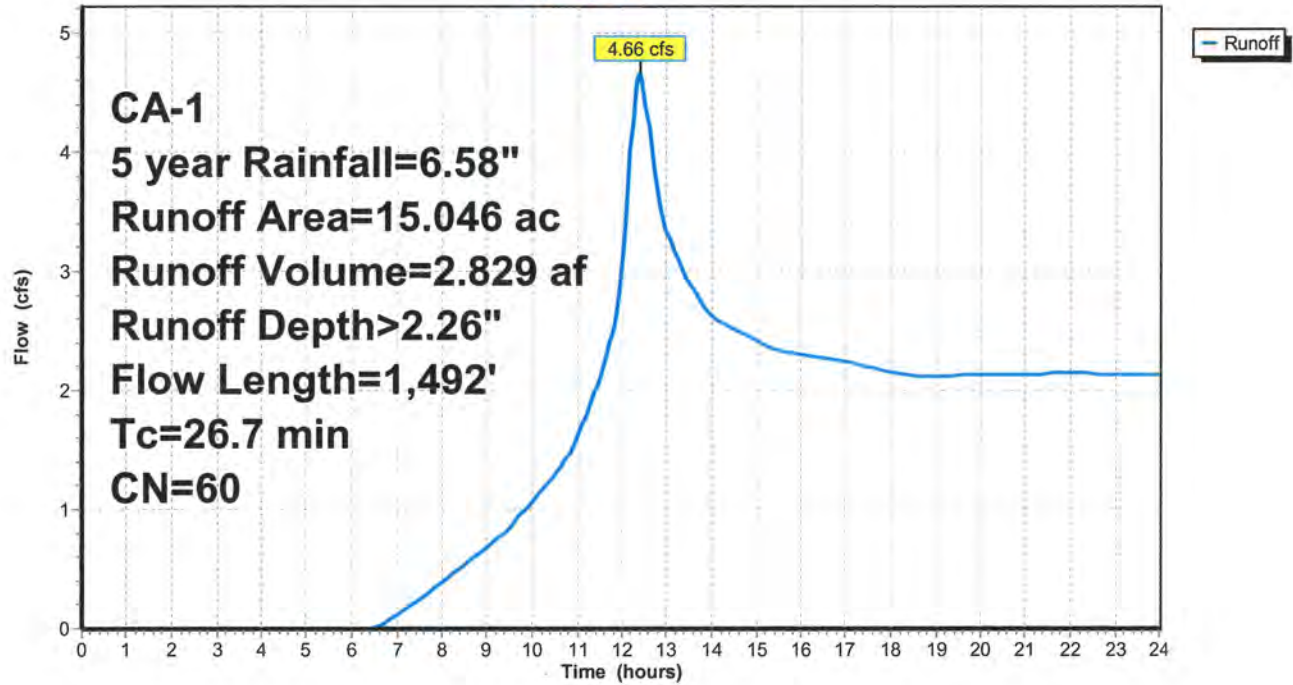
CA-1 5 year Rainfall=6.58"

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### Subcatchment D: POST WS D

Hydrograph



**POST WS D R1**

CA-1 10 year Rainfall=7.75"

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**Summary for Subcatchment D: POST WS D**

Runoff = 6.50 cfs @ 12.39 hrs, Volume= 3.859 af, Depth&gt; 3.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 10 year Rainfall=7.75"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

## POST WS D R1

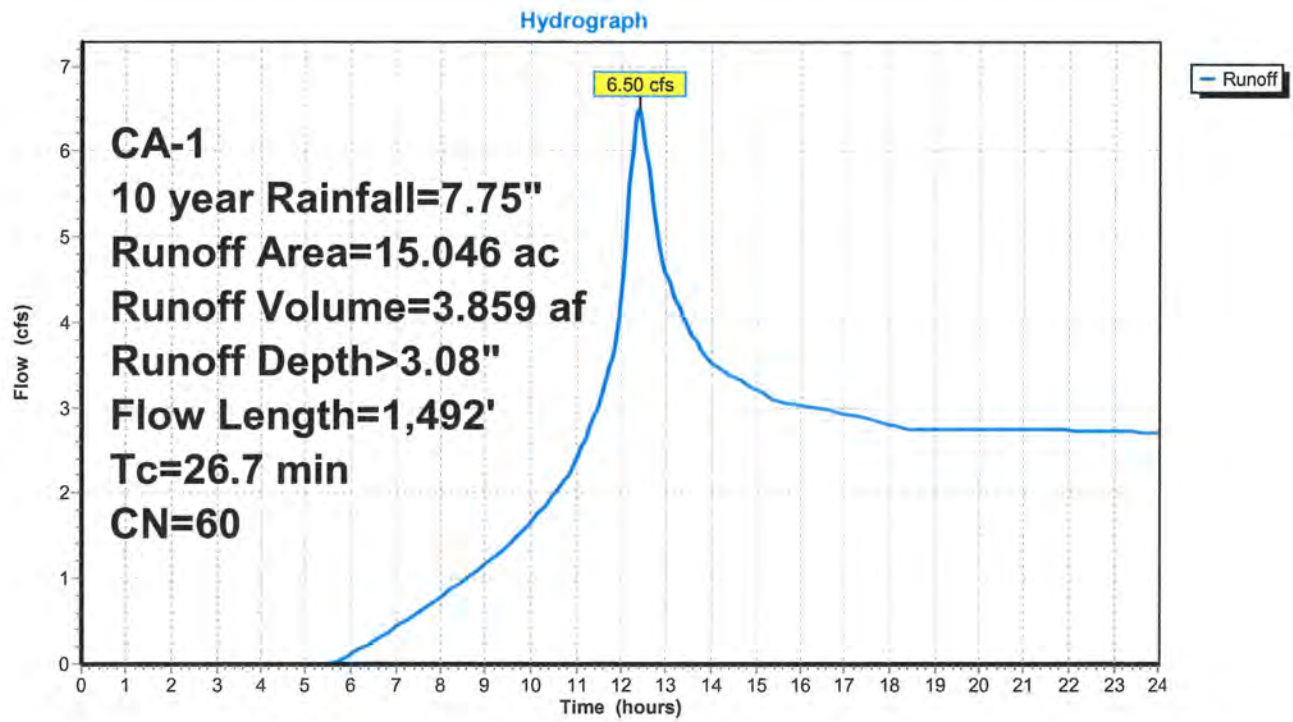
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CA-1 10 year Rainfall=7.75"

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### Subcatchment D: POST WS D



**POST WS D R1**

CA-1 25 year Rainfall=9.43"

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**Summary for Subcatchment D: POST WS D**

Runoff = 9.31 cfs @ 12.38 hrs, Volume= 5.454 af, Depth&gt; 4.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 25 year Rainfall=9.43"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

# POST WS D R1

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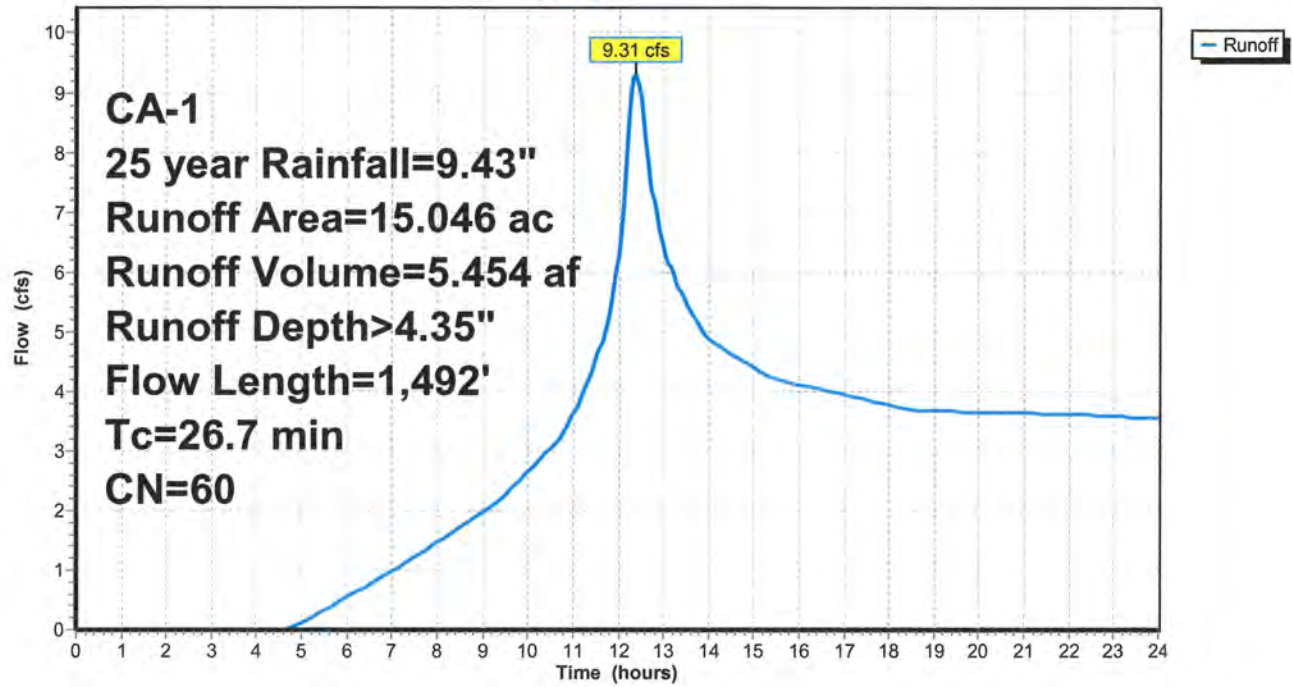
CA-1 25 year Rainfall=9.43"

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## Subcatchment D: POST WS D

Hydrograph





**POST WS D R1**

CA-1 50 year Rainfall=10.70"

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**Summary for Subcatchment D: POST WS D**

Runoff = 11.52 cfs @ 12.38 hrs, Volume= 6.727 af, Depth&gt; 5.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 50 year Rainfall=10.70"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

## POST WS D R1

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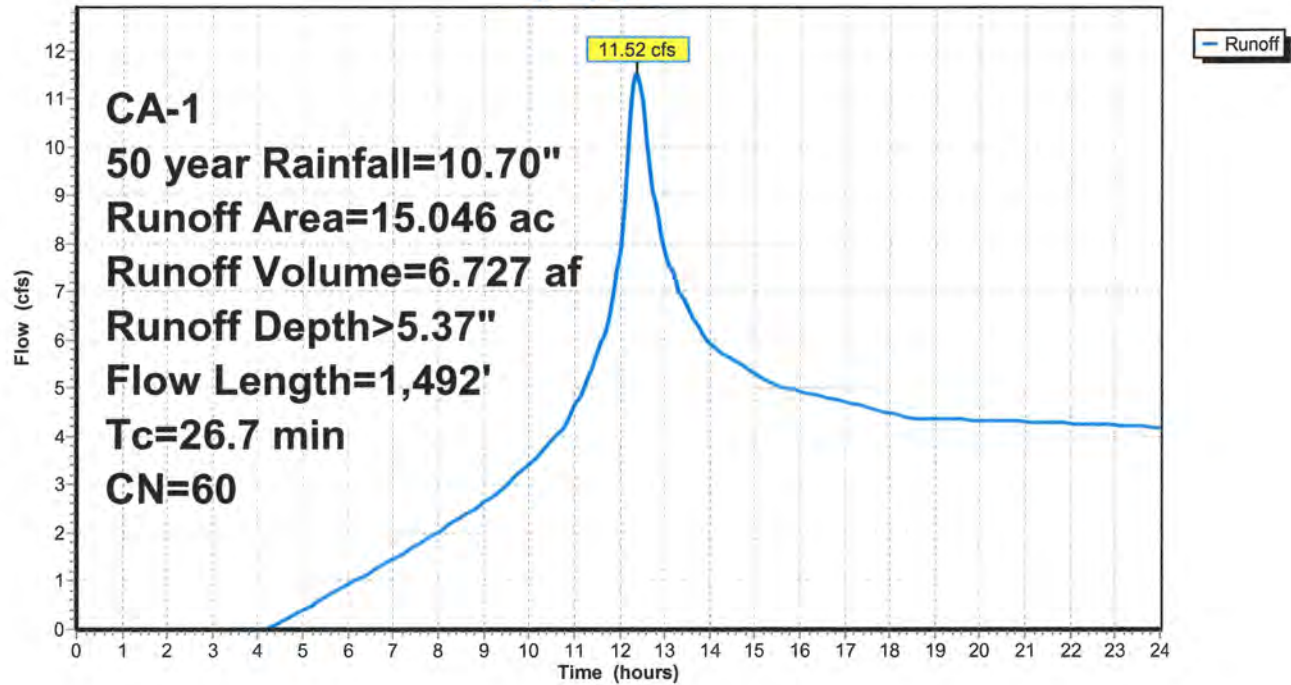
CA-1 50 year Rainfall=10.70"

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### Subcatchment D: POST WS D

Hydrograph



**POST WS D R1**

CA-1 100 year Rainfall=11.90"

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**Summary for Subcatchment D: POST WS D**

Runoff = 13.67 cfs @ 12.38 hrs, Volume= 7.970 af, Depth&gt; 6.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
CA-1 100 year Rainfall=11.90"

Area (ac)	CN	Description
10.678	60	Woods, Fair, HSG B
0.047	73	Woods, Fair, HSG C
1.417	56	Brush, Fair, HSG B
* 2.641	61	>75% Vineyard, Good, HSG B
* 0.263	75	>75% Vineyard, Good, HSG C
15.046	60	Weighted Average
15.046		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	100	0.1200	0.20		<b>Sheet Flow, Post WS D</b> Woods: Light underbrush n= 0.400 P2= 5.09"
6.9	463	0.0496	1.11		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
2.1	336	0.2827	2.66		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
9.4	593	0.0438	1.05		<b>Shallow Concentrated Flow, Post WS D</b> Woodland Kv= 5.0 fps
26.7	1,492	Total			

## POST WS D R1

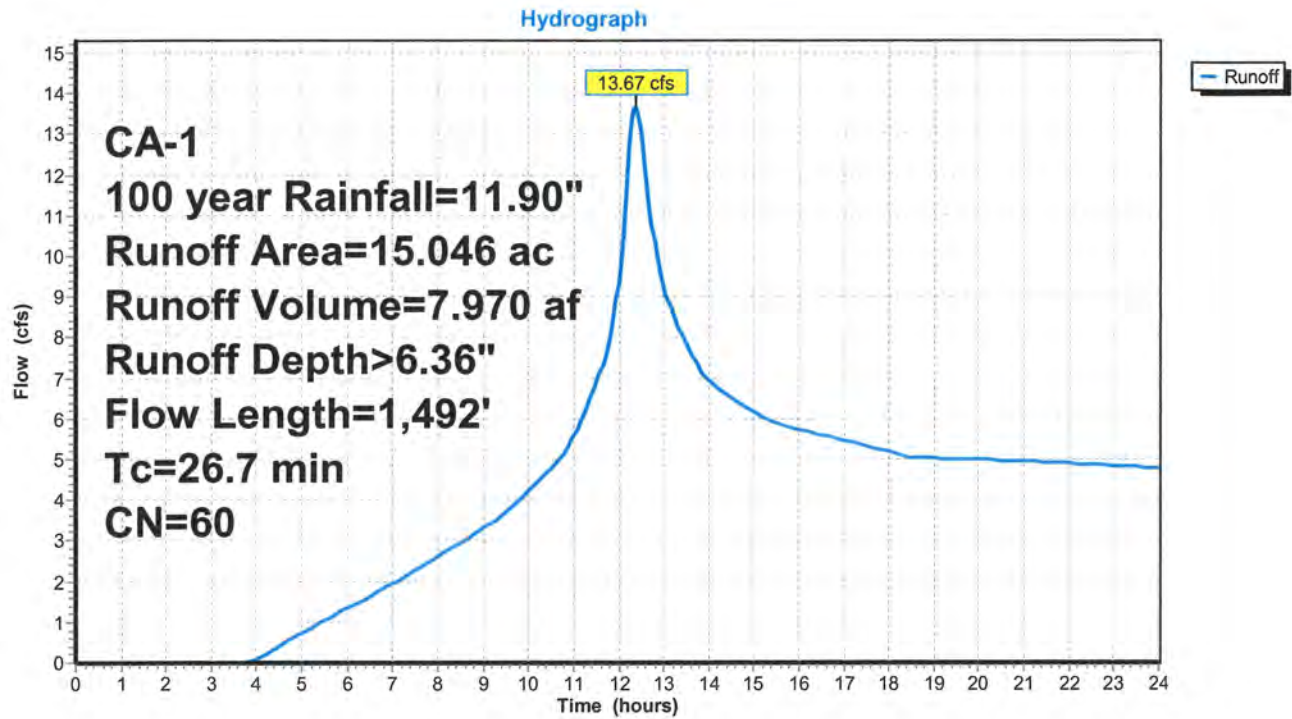
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CA-1 100 year Rainfall=11.90"

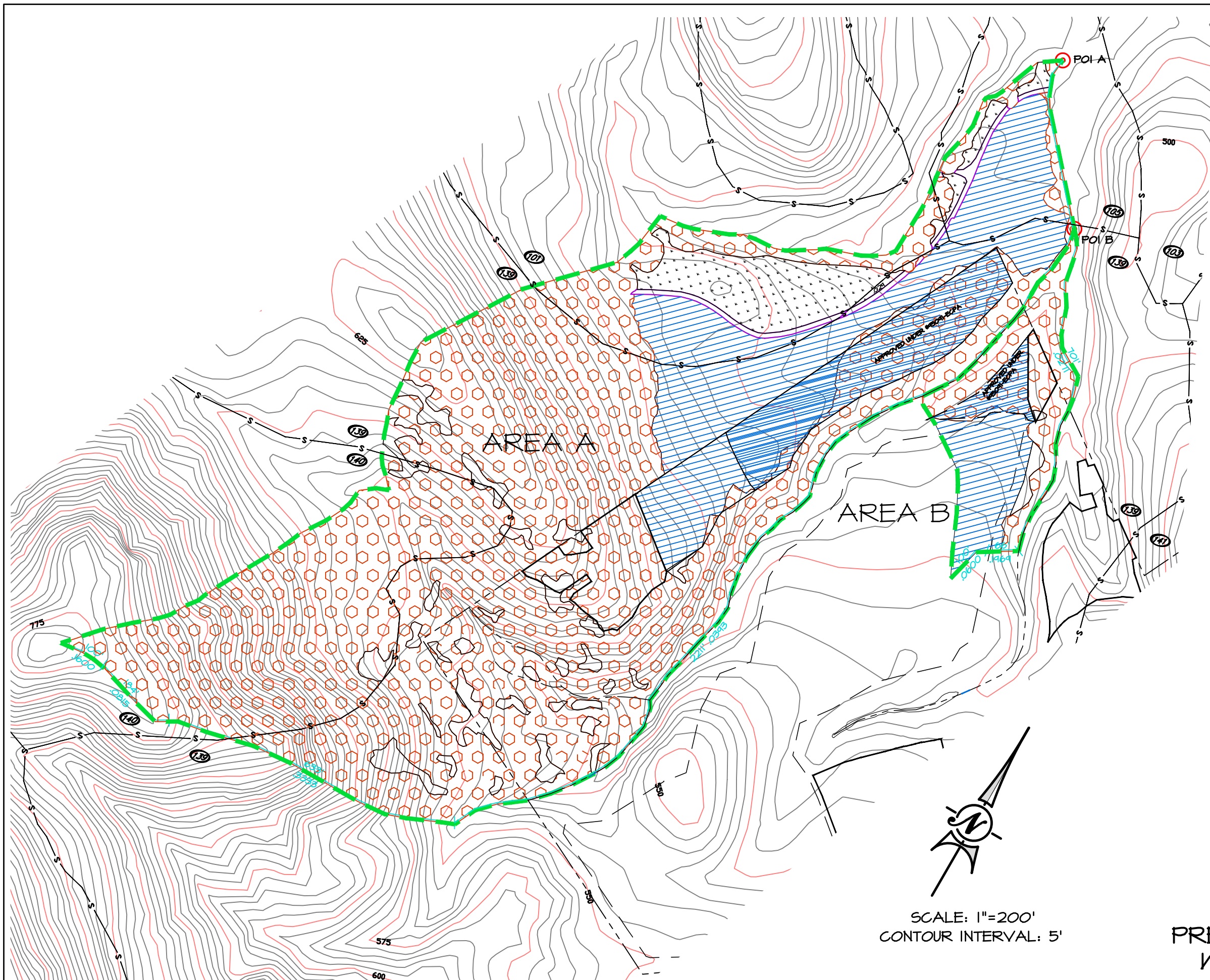
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### Subcatchment D: POST WS D







## PRE PROJECT

### Area A

SOIL 105, 139, 140 = B

TOTAL AREA = 25.13 ACRES

TREE AREA = 19.51 ACRES

BRUSH AREA = 1.16 ACRES

DEVELOPED AREA = 0.12 ACRES

PASTURE AREA = 0.20 ACRES

VINEYARD AREA = 4.14 ACRES

SOIL 101 = C

TOTAL AREA = 3.27 ACRES

TREE AREA = 1.21 ACRES

PASTURE AREA = 1.25 ACRES

DEVELOPED AREA = 0.12 ACRES

VINEYARD AREA = 0.69 ACRES

### Area B

SOIL 139 = B

TOTAL AREA = 2.46 ACRES

TREE AREA = 1.44 ACRES

BRUSH AREA = 0.08 ACRES

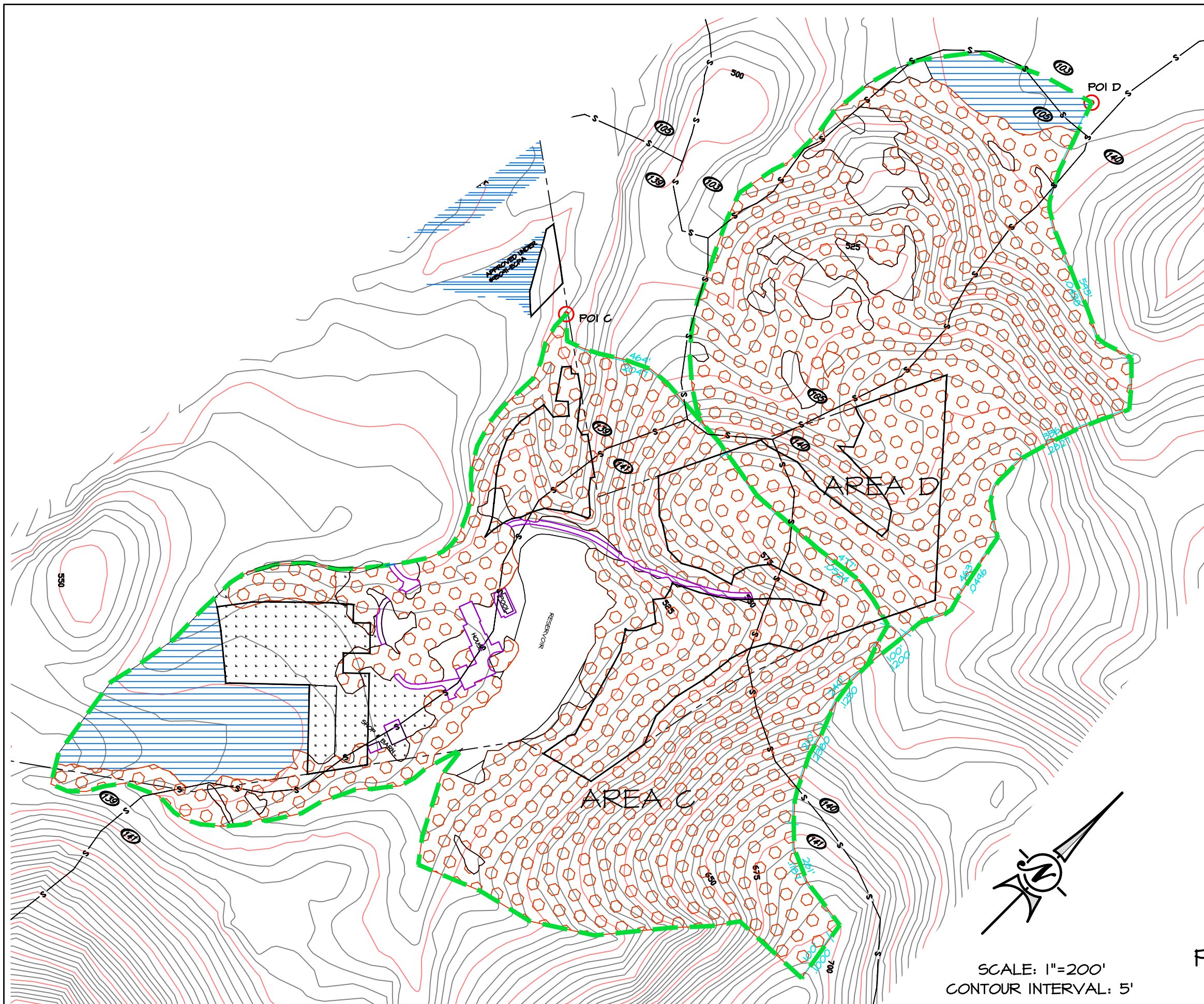
VINEYARD AREA = 0.94 ACRES

## LEGEND

	FLOW PATH
	POINT OF INTEREST
	SOIL TYPE
	SOIL TYPE BOUNDARY
	BRUSH AREA
	TREE CANOPY
	EXISTING VINEYARD
	PASTURE AREA
	WATERSHED BOUNDARY

SCALE: 1"=200'  
CONTOUR INTERVAL: 5'





## PRE PROJECT

### Area C

SOIL 105, 139, 140 = B  
 TOTAL AREA = 10.34 ACRES  
 TREE AREA = 5.83 ACRES  
 BRUSH AREA = 0.11 ACRES  
 DEVELOPED AREA = 0.17 ACRES  
 PASTURE AREA = 1.89 ACRES  
 VINEYARD AREA = 2.34 ACRES

### SOIL 141 = C

TOTAL AREA = 14.56 ACRES  
 TREE AREA = 12.22 ACRES  
 BRUSH AREA = 0.44 ACRES  
 DEVELOPED AREA = 0.22 ACRES  
 PASTURE AREA = 0.11 ACRES  
 WATER SURFACE AREA = 1.57 ACRES

### Area D

SOIL 103, 105, 140 = B  
 TOTAL AREA = 14.74 ACRES  
 TREE AREA = 12.61 ACRES  
 BRUSH AREA = 1.42 ACRES  
 VINEYARD AREA = 0.71 ACRES

### SOIL 141 = C

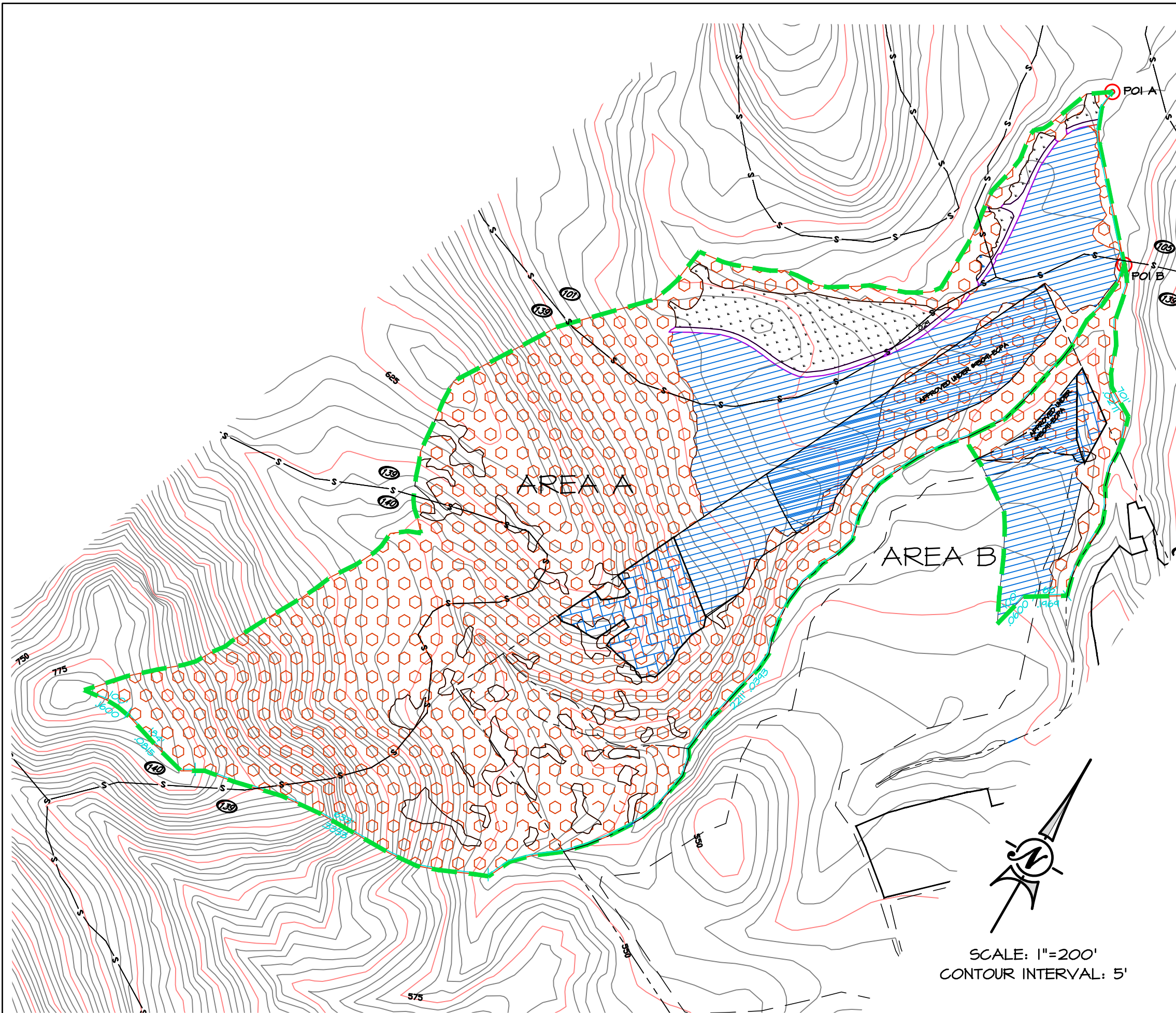
TOTAL AREA = 0.31 ACRES  
 TREE AREA = 0.31 ACRES

## LEGEND

	FLOW PATH
	POINT OF INTEREST
	SOIL TYPE
	SOIL TYPE BOUNDARY
	BRUSH AREA
	TREE CANOPY
	EXISTING VINEYARD
	PASTURE AREA
	WATERSHED BOUNDARY

SCALE: 1"=200'  
 CONTOUR INTERVAL: 5'





NAPA COUNTY GIS DATA BASE

## POST PROJECT

### Area A

SOIL 105, 139, 140 = B

TOTAL AREA = 25.13 ACRES

TREE AREA = 18.24 ACRES

BRUSH AREA = 1.12 ACRES

DEVELOPED AREA = 0.12 ACRES

PASTURE AREA = 0.20 ACRES

VINEYARD AREA = 5.45 ACRES

SOIL 101 = C

TOTAL AREA = 3.27 ACRES

TREE AREA = 1.21 ACRES

PASTURE AREA = 1.25 ACRES

DEVELOPED AREA = 0.12 ACRES

VINEYARD AREA = 0.69 ACRES

### Area B

SOIL 139 = B

TOTAL AREA = 2.46 ACRES

TREE AREA = 1.29 ACRES

BRUSH AREA = 0.08 ACRES

VINEYARD AREA = 1.09 ACRES

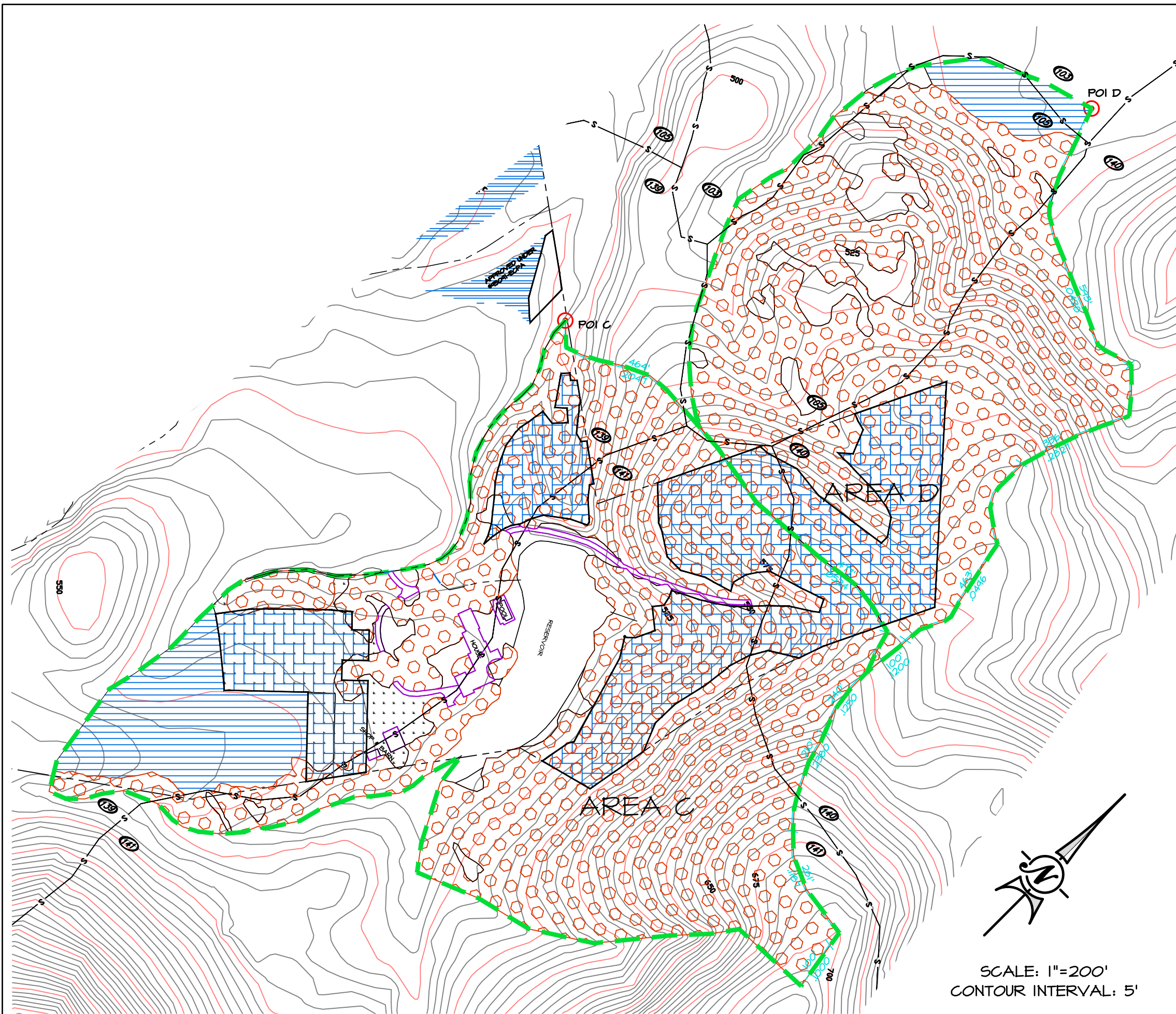
## LEGEND

	FLOW PATH
	POINT OF INTEREST
	SOIL TYPE
	SOIL TYPE BOUNDARY
	BRUSH AREA
	TREE CANOPY
	EXISTING VINEYARD
	PASTURE AREA
	PROPOSED VINEYARD
	PROPOSED VINEYARD AREA
	WATERSHED BOUNDARY

SCALE: 1"=200'  
CONTOUR INTERVAL: 5'

ED JOHNSON VINEYARD  
POST PROJECT-LAND USE MAP  
WATERSHED AREA A & B  
NVVE 1-9-20 RI





## POST PROJECT

### Area C

SOIL 105, 139, 140 = B

TOTAL AREA = 10.34 ACRES

TREE AREA = 2.40 ACRES

BRUSH AREA = 0.07 ACRES

DEVELOPED AREA = 0.17 ACRES

PASTURE AREA = 0.54 ACRES

VINEYARD AREA = 7.16 ACRES

SOIL 141 = C

TOTAL AREA = 14.56 ACRES

TREE AREA = 11.33 ACRES

BRUSH AREA = 0.44 ACRES

DEVELOPED AREA = 0.22 ACRES

PASTURE AREA = 0.11 ACRES

WATER SURFACE AREA = 1.57 ACRES

VINEYARD AREA = 0.89 ACRES

### Area D

SOIL 103, 105, 140 = B

TOTAL AREA = 14.74 ACRES

TREE AREA = 10.68 ACRES

BRUSH AREA = 1.42 ACRES

VINEYARD AREA = 2.64 ACRES

SOIL 141 = C

TOTAL AREA = 0.31 ACRES

TREE AREA = 0.05 ACRES

VINEYARD AREA = 0.26 ACRES

## LEGEND

	FLOW PATH
	POINT OF INTEREST
	SOIL TYPE
	SOIL TYPE BOUNDARY
	BRUSH AREA
	TREE CANOPY
	EXISTING VINEYARD
	PASTURE AREA
	PROPOSED VINEYARD
	PROPOSED VINEYARD AREA
	WATERSHED BOUNDARY

SCALE: 1"=200'  
CONTOUR INTERVAL: 5'

NAPA COUNTY GIS DATA BASE

ED JOHNSON VINEYARD  
POST PROJECT-LAND USE MAP  
WATERSHED AREA C & D  
NVVE 1-9-20 RI